IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF MASSACHUSETTS

CARDIAQ VALVE TECHNOLOGIES, INC., Plaintiff -VS- NEOVASC INC., et al, Defendants	)	CA No. 14-12405-ADB Pages 4-1 - 4-222

JURY TRIAL - DAY 4

BEFORE THE HONORABLE ALLISON D. BURROUGHS
UNITED STATES DISTRICT JUDGE

United States District Court
1 Courthouse Way, Courtroom 17
Boston, Massachusetts 02210
May 5, 2016, 9:37 a.m.

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A P P E A R A N C E S:

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I N D E X

P R O C E E D I N G S

THE COURT: So I'm actually coming out here to discuss the JenaValve motion, and then I realized you filed a response to it, which I haven't read the response. So I can read it now, maybe I'll have a few minutes after I read it and we can take it up after the break.

Does it need to be resolved today?

One question -- it may be cleared up in the second brief, I've only read the first one -- was JenaValve a Neovasc customer when Randy Lane was working on that or was that something he did before his time with Neovasc?

MR. GRAVES: JenaValve was a customer that he worked with before CardiAQ. And I believe afterwards also, I don't know when he ended.

THE COURT: When are the dates? Is the company called "JenaValve"?

MR. GRAVES: It was at least in the year 2008, I don't know the start or the end dates however.

MS. LEA: For the record, your Honor, we don't know either.

THE COURT: When did Neovasc start as a company?

MR. GRAVES: The present iteration, after some mergers and acquisitions, I believe was 2007. Again, I don't have the exact date, but around that point.

THE COURT: When did Randy Lane go to work for them?

MR. GRAVES: Again, it's a little confusing because there were a bunch of mergers and acquisitions, but I believe it was also in 2007.

THE COURT: And his work on JenaValve continuous? Like he starts -- comes with him to Neovasc in 2007 and then he keeps working on it or is it --

MR. GRAVES: I don't know the answer, but I believe so.

THE COURT: You think he did some work with them.

(Discussion off the record.)

THE COURT: If one of you wants to stand up.

(Discussion off the record.)

MR. GRAVES: So it started in 2007, your Honor.

THE COURT: What did?

MR. GRAVES: The relationship with JenaValve, the customer.

THE COURT: And Neovasc or JenaValve and Randy Lane?

MR. GRAVES: Correct, all of those.

THE COURT: So Randy Lane's work on JenaValve began when JenaValve came to Neovasc?

MR. GRAVES: Or thereabouts. Certainly by early 2008.

THE COURT: Okay.

Okay. I need to read the response.

Is there anything else this morning?

MR. GRAVES: I think we can put over the arguments on

the expert Hillstead because I don't think we're going to get to him today.

THE COURT: Which arguments on the expert?

MR. GRAVES: We have some objections to some of his exhibits.

THE COURT: What's the plan for today?

How much longer on direct on --

MR. SGANGA: We're probably going to run the morning with Mr. Ratz, and if we have time in the afternoon after cross, then we have some video deposition to play.

THE COURT: Okay. Okay, so it was a nice offer yesterday on buying the jurors' lunch. I think the clerk's office is going to take care of it.

When I asked them, they said you cannot buy them lunch, you also cannot buy them a car. That was their response.

(Laughter.)

THE COURT: So is there anything else for this morning?

MR. BASKIN: Your Honor, the parties have agreed to pre-admit a set of exhibits.

THE COURT: Great. Hold on, let me find it.

Okay.

MR. BASKIN: They are numbers 1030, 1031, 1033, 1034, 1035, 1337, 1338, 1339, 1049, 1050, 1051, 1052, 1053, 1094,

1095, 1096 --

THE COURT: Hold on. Yes.

MR. BASKIN: 1097, 1098, 1099, 1398, 1482, 2322, 2342, 2343, 2344, 2345, 2346, 2347 --

THE COURT: Hold on a second.

(Discussion off the record.)

THE COURT: Okay. 2347.

MR. BASKIN: Yes, your Honor. 2348, 2349, 2350, 2351, and finally, 2358.

THE COURT: You guys got those all? Great.

(Exhibits 1030, 1031, 1033, 1034, 1035, 1337, 1338, 1339, 11049, 1050, 1051, 1052, 1053, 1094, 1095, 1096, 1097, 1098, 1099, 1398, 1482, 2322, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2358 received in evidence.)

All right. Anything else?

Okay, so we'll have another 15 minutes and bring the jury down.

MR. GRAVES: Thank you, your Honor.

(Recess taken.)

(Jury entered the courtroom.)

THE COURT: Good morning, everyone. Thanks for getting here on time. You'll notice at some point this morning there's a group of students that's going to be observing for a while. I need to take a 15-minute break to talk to them. So we'll take a 15-minute recess at some point this morning.

Mr. Ratz is still on the stand.

I remind you that you remain under oath.

You may proceed.

MR. SGANGA: Thank you, your Honor.

JEREMY BRENT RATZ, having been previously duly sworn by the Clerk, was further examined and testified as follows:

CONTINUED DIRECT EXAMINATION

BY MR. SGANGA:

Q. Good morning, Mr. Ratz.

A. Good morning.

Q. Yesterday afternoon we were talking about the animal studies that you did in September with that modified Rev. C frame. Do you remember that?

A. I do.

Q. How meaningful were the changes in the design that you made in that modified Rev. C design to the performance of the TMVI device?

A. It was very impactful. We had seen the concerns when we first went in in August of 2009, so there were a number of things that we tried to change and did change in those mocked-up Rev. C designs to influence the performance of those devices so that they functioned much better when we went back in in September. So it was a huge advancement and a big part of the learning, major part of the learning as we moved forward.

Q. So did you use the information that you used from that successful animal test to come up with yet another revision to the TMVI design?

A. We did. We tried to incorporate those modifications that we had made on the fly to the Rev. C to the Rev. D design along with some other enhancement.

Q. I'd like to pull up on the screen PDX 3.7.

Does this show an image of that modified Rev. C on the left and the new Rev. D design on the right?

A. Yes, that's correct.

Q. Can you identify what some of the design differences were that you came up for this Rev. D design?

A. This is the modified version of the Rev. C on the left here, so it already has some of those changes that we made during the animal studies to add that extra row of diamonds along the bottom, change that skirt and just have it attach at the base of those left ventricular anchors to leave as much as possible of those left ventricular anchor tips exposed. We had cut off the top row of struts because we knew it was too high in the atrium after the first animals in August, and we had just put a protective covering on that because we had cut it with some wire cutters on site, and so to protect that, we had covered that. We didn't need that once we remade the frame. But this is what we were kind of working from as we went to the Rev. D.

So a number of changes happened when we went to the Rev. D. First of all, just looking at from the base there, we had added these extra row of diamonds into the Rev. C. We incorporated that into the actual frame design here because we noticed from the August study that we needed more support in the ventricle, the frame was still moving. One of the things that's of particular importance with this material that we're working with, nitinol, nickel titanium, is that we don't exceed a certain level of straining in the device or movement in the device. If that happens, then it can fracture. So if you think about moving a paper clip back and forth, back and forth, eventually it breaks. With this material we need it to withstand millions and millions of heartbeats and so we can't have that much motion in the frame. That's why we had reinforced it in the Rev. C, and then we incorporated that into the actual frame design of the Rev. D.

Q. Now, did you widen the ventricular or bottom end of the device in Rev. D?

A. We did. You can see the difference here. One of the things that we had noticed, actually, which we didn't talk about yet, but in the September study we went into adult sheep. We found that annulus to be too large. We went to juvenile sheep when we went in September because we needed a smaller annulus to match the Rev. C frame that we had. But we wanted to be able to work with adult sheep and work with the size that

was representative of the human anatomy, so we increased this ventricular size to 40 millimeters. We came up with this two-level design so that the valve could be a smaller diameter up top than what would be in the ventricle and intra-annular at the bottom side here. And there's a couple of reasons for that. One, we wanted to displace the valve so it wasn't influenced by the shape of the annulus itself so that it could still function symmetrically in the top region. The other is that -- again, all of this comes back to wanting to deliver it via catheter. So we had to able to compress this down to a diameter about the size of your pinky. If you want to do that and get as small as possible, then part of what influences that is the frame, part what influences that is the volume of tissue that you've got to compress.

So if we could achieve the same result with a smaller tissue valve, then we could get that into a smaller catheter in the end, so that's what was driving that concept.

Q. Did you modify the shape of those ventricular anchors or bottom anchors as well?

A. We did. So they were kind of straight out on both sides in the past. We added this S bend configuration partly to be able to get further behind the leaflets and leave more room there, and partly to impact how this device saw the loading from that systolic pressure, from that high pressure in the ventricle. So if you can imagine, it goes straight out to the

sides, then there's a potential it's going to go into the wall of the heart or into the myocardial tissue here. We didn't want that. We wanted to go straight up into the annulus. And if you have that sort of end on a vertical, then you can take on that load better without having that influence the device or having it want to bend back so much. So there was load distribution going on there as well as being able to reach behind the leaflets.

It's hard to tell from here, but we changed the tips to make them atraumatic. So we broadened those tips as much as we could there to add more of a bulbous end to it as opposed to the tips before that were kind of coming to a point when we thought we were wanting to penetrate through the leaflets on the inside. Now that we're going behind, we wanted to make these atraumatic so that they could engage the annulus, put pressure on it but not go through it.

Q. So now, Mr. Ratz, you're going to design work towards Rev. D starting in mid-September, after those animal studies, right?

A. Yes. Starting immediately after the animal studies we're thinking about all these changes, we started make sketches and then we went on from there.

Q. How soon after that did you tell Neovasc that you were planning to make these changes to Rev. D?

A. Almost immediately, really in real time. We had met them, as we talked about, at the conference at TCT in September and

started discussing what we had seen from the animal study there and what changes we thought we were going to make in addition to the e-mails that were exchanged. As then soon as Rev. D came alive and we knew more about it even just conceptually in the notebook we started sharing those with Neovasc.

Q. So you didn't wait until you actually got the metal frames made up for Rev. D before you started sharing with Neovasc, did you?

A. No, there was no lag time there.

Q. So let's turn to Exhibit Number 1189. This is an e-mail you sent to Mr. Lane, correct?

A. Yes, it is.

Q. I want to point out the date here.

What's the date you sent this e-mail?

A. October 12, 2009.

Q. And what did you attach to this e-mail?

A. A number of files. So illustrations, PDF of what we were thinking for the valve concept, for the changes that I think we've seen before from Rev. C to Rev. D --

Q. If you go to the attachment on page 6, can you tell us what you've shown here?

A. Yes. This is -- again, I think it's come up before, but this is the Rev. C in its original form on the left, and then, you know, I just kind of played around with it in Microsoft Paint to sort of cut and paste and show what we wanted to do

with marked up in red here, how the shape of the anchors was going to change and then how the height was going to change to eliminate that top row.

This is even before we had the concept for making it the two-level diameter. This is really just the first thinking of trying to incorporate what we saw there, adding the extra row of support struts to stiffen the base in the ventricle, and then making this more of an S shape as well.

Q. And are those changes described in these bullet points under that heading "Modification"?

A. Yes.

Q. And you prepared this so that you could help educate Mr. Lane more about the planned design changes to Rev. D; is that right?

A. Yes. Again, we were educating them on sort of everything that was changing that we thought was going to impact their ability to get the tissue valve in there and wanted them to be moving in parallel, even as we were trying to refine this just to see if any issues came up on their side or, you know, to give them a head start so we didn't lose any time.

Q. If we go to the next page on the attachments, page 7, can you tell us what this drawing shows?

A. This is a PDF of one half of one cell. So this is the part that kind of repeats through it. If you put a mirror image of this, then you'd get one cell. This is sort of half

of the mushroom-shaped tab at the top there, and then that first left atrial support strut.

This is kind how I drew it in the CAD model. So that I would start with that, and then you could sort of mirror that and repeat it around to make the rest of the a pattern.

What you see here in the straight-line form is just an approximation of if you calculate that you've got 12 cells, you figure what the circumference of that is and then you convert that to a straight-line distance, you can take 1/12th of that and figure out how wide these cells are going to expand. So you can kind of get that expanded angle of inclusion there. This is what the diamond would roughly look like after you expand it. And then the silhouette that you see here is the intended shape of that expanded left atrial anchor, and then the intended shape or silhouette bend pattern of that left ventricular anchor.

Q. And the next page, your page 8 of 8, is this the flat pattern that you had used to cut the tube to make the frame?

A. Correct. So that's the full flat pattern now. If you cut one of these mushrooms in half, that's what you saw on the other page, that's repeated now to make the 12 cells. It would be to laser cut from a tube, imagine that wrapped around, and then expanded to make the final shape.

Q. Were you sharing this kind of detailed information about your planned changes to the Rev. D design with anyone else

besides Neovasc?
A. No.
Q. Now, during the opening statement you saw Neovasc's counsel, Mr. Flynn, play a video of you dated October 13, 2010. Do you remember that?
A. I do.
Q. You pointed out that you didn't say anything about revealing the breakthrough of having the anchors go through the chords and behind the leaflets. Why didn't you talk about that level of detail in that October 13, 2010 video?
A. Because it was a video that we were publicly going to post on our website that we did with our PR representative. Actually, we filmed at TCT in San Francisco that year. So we never would have said anything that was secret, that was kind of our breakthrough in the anchoring, in a video that we were going to post publicly. It wasn't our intent to give away the secrets in that way.
Q. Do you think Randy Lane got more information about those anchoring secrets?
A. Certainly.
Q. And from the information you were giving him about the progression in the design changes, do you know what that communicated?
A. Well, he saw the whole chronology, he saw the whole progression --

MR. FLYNN: Objection, do you know what that communicated.

THE COURT: I couldn't hear you over --

THE WITNESS: Sorry, can I go?

THE COURT: No, I couldn't hear what the objection was.

MR. FLYNN: I'm sorry, your Honor. I think that calls for speculation. The question asks what Randy Lane understood.

THE COURT: No, the question was do you know. That's allowed. Overruled.

BY MR. SGANGA:

Q. Do you remember the question?

A. Can you repeat the question?

Q. Okay.

So you were giving information to Mr. Lane about the progression of the design changes on your frames. Do you know what that communicated about the way the device was anchoring?

MR. FLYNN: Same objection.

THE COURT: Overruled.

A. It was communicating the changes that we were making so that we had gone from the Rev. C with the fully covered anchors, we had removed that skirt in order for the anchors to go in between. Randy Lane was aware of all these changes that we were making to the device at that time, so to me it was clear that he was getting a lot more information than anything

that we were showing publicly.
Q. We talked about that video, I think I may have misspoken. It was October 13, 2009; is that correct?
A. Yes.
Q. Let's turn now to Exhibit 1190.
This is another e-mail from you to Neovasc, including Mr. Lane, correct?
A. That's correct.
Q. And the date on this is October 15, 2009, right?
A. Yes.
Q. And can you tell us what kind of files there are attached to this October 15, 2009 e-mail?
A. So this includes just a bitmap illustration but also the DWG drawing of the flat pattern. So that's the actual drawing with the engineering content. It has all the dimensions in it. It can be used to laser cut the pattern. It's the same drawing that we would provide our stent manufacturer, frame manufacturer. They would use it to laser cut it and expand it.
Q. I just want to make sure I understand what you're saying.
Once this computer file is loaded with computer design software, what can an engineer do with that when it's up on the computer screen?
A. You can basically make the part. You've got all the dimensions for it. So you can check dimensions, you can measure radius, you can measure width, you can measure the

length of anything. All the information is contained there that you can open up in any CAD software and access. You can make changes to it from there --

Q. How easy is it to make those changes?

A. It's click and pull and point and click and very simple.

Q. And then how easy is it to take that information on that Computer-Aided Design file, the CAD file we've been calling it, to go from there to a manufacturing machine that can actually fabricate the frame?

A. Again, very simple. It's one step to, you know, incorporate that into a laser cutting program. And like I said, that would be the same file that I would send to our frame manufacturer and say this is what we want to have made, and they wouldn't need anything else from me except for the size of the tube or the wall thickness of the tubes that we want to cut it from and the material information.

Q. Okay.

Why don't we go to the attachment to this October 15, 2009 e-mail, page 3 of 4.

Can you tell us what we're seeing here?

A. So this is that bitmap that is a screenshot essentially from that DWG, the fully, I guess, characterized engineering information. It also contains the notes that indicate what I was just referring to for the tubing and material information.

So it says the size in the 8 millimeter OD or 8

millimeter outer diameter. The wall thickness is half a millimeter. It says the material is nitinol. The AF temperature is 0 to 8 degrees Celsius.

Q. What does that mean, the "AF"?

A. It's a technical term for the austenitic finish temperature of nitinol. So nitinol has this really cool property that you can cool it down in ice and you can squeeze it if you've got this expanded frame, and it will stay put, it won't move from that shape whatever you squeeze it to if you put it in a catheter. And then if you take it past its a sub f temperature, it converts to a different form of the structure, so from martensite to austenite, and then it will, say at body temperature, return to this rigid shape. So it's one of things that enabled us to use it as a transcatheter heart valve.

Q. Is this the same information you were giving to the manufacturer to actually fabricate the Rev. D frames?

A. Yes.

Q. Who was that manufacturer?

A. At this point we went to the Rev. D design, we had shifted to another manufacturer. That manufacturer was called Admedes. They were in Germany, and they did all of our nitinol frame manufacturing from that point forward.

Q. Let's turn to the last page, page 4 of 4, in this exhibit, 1190, the October 15, 2009 e-mail.

Can you tell us what we see here?

A. This is the detail of sort of what we had seen in that one half a cell structure before of all the dimensions required to kind of shape set this left atrial anchor on top. And then the left ventricular anchor on the bottom. So the distance that it's extending out the frame .157 inches is roughly four millimeters. So everything else is in fractions of an inch here, but it describes the radius and everything else. So this is all the same type of information, details that you could get by pointing and clicking on a flat pattern for that portion of it, and this is describing the three-dimensional shape that we want to create from that flat pattern after it's expanded.

Q. So how does that dimension, that four millimeters or .157 inches for the frame spacing, how does that relate to the device anchoring in the heart?

A. It defines how far off -- so if we're anchoring -- we're expanding into the intra-annular region -- if I go to the anatomy chart here. So we're expanding in this region, that's what we're saying we want that to be 40 millimeters now. So that four millimeters describes from the inside of the frame as we wrap that left ventricular anchor around behind the leaflets how far we want that anchor tip to be from where the inside of the frame lands.

Q. So did you have the frames actually manufactured for this Rev. D design that we're seeing?

A. Yes, we did.

Q. In the little cup there in front of you, we've got what we've marked Exhibit 1006. Can you tell us what that is?
A. This is one of the first Rev. D frames that we had made. So initially we had asked them just to expand it to 40 millimeters, and then it was after we got this that we had the concept to just limit the upper portion to the 30 millimeters. And so we went back and had them make more from the same flat pattern and just said here's where we want the transition region and make the top only go to 30 and then keep the bottom at 40.
Q. So this is the first Rev. D then you had made up where the diameter is pretty much the same throughout the whole thing?
A. That's correct.
MR. SGANGA: Your Honor, may I approach and publish the exhibit?
THE COURT: You may.
Is there any objection?
MR. FLYNN: No, your Honor.
THE COURT: Go ahead.
(Exhibit published to the jury.)
BY MR. SGANGA:
Q. So did you receive those metal Rev. D frames yourself when they -- after they were made by Admedes?
A. Yes, I did.
Q. And you were located still in your home office in

Winchester, Mass. at that time?
A. That's correct.
Q. Okay.
Let's turn now to Exhibit 1191.
Is this a November 10, 2009 e-mail from you to Mr. Lane?
A. Yes, it is.
Q. And at the bottom of this first page, there's an e-mail from Mr. Lane to you. The very last sentence, do you see where it says, "Is there anything we can do in the foreseeable future to help you with your prototype developments?"
A. Yes.
Q. Did you understand that to be Mr. Lane asking for more information about your prototypes?
A. Yes. He hadn't heard from us in a couple of weeks. We were going through getting these frames made. We had communicated the general concepts to Neovasc already. And so he was checking in to see what was going on, see what the status was, if we were going to be asking them for more assistance from there.
Q. And did you send him information about the Rev. D frames in response?
A. I did.
Q. And attached here to this e-mail, pages 4 of 5 and 5 of 5, are those photos of these new Rev. D frames?

A. Yes. So, again, we had received the one that's being passed around right now at the 40 millimeters, and we weren't happy with how that was going to operate for us. We wanted to have that reduced diameter section at the top, so that's what required us to go back and have more frames made. So these frames had actually just arrived that day when I received the e-mail from Mr. Lane, and I sent these pictures to him and informed him that, I think as we saw in the e-mail, that the timing was perfect and we're ready to move forward.

Q. So who else besides Neovasc did you send these pictures of this new Rev. D frame that you had just received?

A. Nobody. The only other people that had ever seen these frames were the people that manufactured it for us.

Q. Who else outside of CardiAQ knew that you were at this particular stage in your development of your prototype TMVI device besides Neovasc?

A. No one.

Q. Let's turn to Exhibit 1192.

Is this also an e-mail chain between you and Mr. Lane?

A. Yes, it is.

Q. And if we go to the second page of the exhibit, there's an e-mail from Randy Lane to you dated November 10th. Do you see that?

A. I do.

Q. And what does Mr. Lane say in the first sentence of the

e-mail about the Rev. D frame that you just sent him?
A. He said the frames look great and we can certainly assemble a valve on the top frame prior to your big design meeting.
Q. Now, if we go to the attachment of the e-mail, which is on page 5 of the exhibit, can you tell us what this shows?
A. Again, this is another Microsoft Paint effort to describe to Mr. Lane what it is that we wanted him to do once he received these frames, how we wanted to have the valve and then the lower ventricular skirt attached. It was, you know, a couple of different concepts here that I was kind of thinking about whether we wanted to have the tissue go through the transition region, you know, on the left-hand side here, into the 40 millimeter region, or have it stop at the 30 and then having the fabric cover the rest of it here; whether we wanted to have it go straight across the bottom just right at the base of where the leaflets would be cut on the anchors here; or whether we wanted to kind of follow the pattern of the frame just as a method of attachment there.
Q. So you just mentioned there were a couple of options there for the skirt. Were any of those options having the skirt wrap around and cover the anchors like you had done before with Rev. C?
A. No. At this point we were not thinking about covering the anchors at all with skirt or fabric or tissue anymore.

Q. So did you issue a purchase order to Neovasc to assemble the Rev. D prototypes?
A. We did.
Q. And if you turn to Exhibit 1195.
Is that the purchase order?
A. Yes, it is.
Q. And this is to order two assembled Rev. D valves, correct?
A. That's correct.
Q. And again, you issued this from your Winchester, Massachusetts address?
A. Yes.
Q. And in the attachment here to this exhibit, this e-mail chain here, talking about page 3 of Exhibit 1195, there at the bottom photo there, the statement refers to some slight accordion ridges. Could you explain what that's referring to?
A. Yes. So we had another thought as we were continuing to think about this prior to assembly, and we were very mindful of the fact that, you know, once we had this valve assembled, we had to compress it down into a catheter. We didn't want anything to be damaged during that compression process. We knew that with the foreshortening of the frame, again, as you compress this, these two sides of the diamond come together, these two apexes of the diamond come apart and create length there. So if this fabric were sewn on very tight, it would increase the loading forces, it might even get to a point where

it could break sutures as we're trying to compress it. So we asked Neovasc to assemble this with some excess fabric in here, essentially having that kind of accordion ridge that I talked about here, just so that it had room to stretch and elongate as we compressed it and loaded it into the catheter.

Q. Now, before you issued this purchase order for the Rev. D prototypes, had you gotten any information from anyone at Neovasc that they were working on a competing TMVI design?

A. No, never.

Q. Did Neovasc, in fact, assemble the Rev. D prototypes?

A. They did.

Q. If we go to Exhibit 1196, is this a memo from Neovasc reporting on the work they did?

A. Yes, it is. So they had sent out an update before they sent the actual parts to us just describing what was done and what they had made.

Q. And the photos here that we're seeing on the first page of Exhibit 1196, can you explain what those are?

A. Yes. So it's the same frame design, the Rev. D with the 30-by-40 diameters. On the left is a version assembled just from fabric so that we could keep it dry and at this design meeting that we were planning for early in December pass it around the room without having to wear gloves or deal with tissue. On the right side is one we had assembled with porcine pericardial tissue.

Q. So who else besides you and the people at Neovasc got to actually handle these physical Rev. D fully assembled prototypes?
A. No one else besides Neovasc and CardiAQ.
Q. So you mentioned that there was a design meeting coming up. When did that happen. Do you recall?
A. I believe it was December 4, 2009.
Q. And did anyone from Neovasc participate in that design meeting?
A. Not in person, but during the course of the meeting, we had a phone call with Mr. Randy Lane.
Q. Were there any other vendors that CardiAQ, used that word "participating" in that design meeting phone call?
A. No.
Q. So what happened to this Rev. D design after the December meeting?
A. We never used it in an animal study. We obviously learned from it, you know, held it in our hands and kind of had ideas from this design meeting, and one of the thoughts was what we called Mr. Randy Lane about was just to try to create a bell-shaped valve that we could lower the profile in the atrium and again bring that height down. And that led us to a concept for the next revision, which was Revision E.
Q. Why don't we pull up PDX 3.8.
Does this show the Rev. D prototype design next to

this next revision that you're referring to?
A. Yes, it does.
Q. Can you tell us what some of those changes were between Rev. D and E?
A. Sure. So you can see from the top we wanted to change the height here in the left atrium. It's actually shorter, even though we introduced another row of struts for more rigidity or radial support, circumferential support.

We got rid of some of the eyelets that we no longer needed for attachment, because we were attaching along the actual frame struts.

We had lowered the valve so that the free edge of those leaflets was at this level now instead of having to stop that at the 30 millimeter height, that was what we were asking Neovasc to think about, whether we could do this as a conical valve so that we could get it even lower and have it come right up to that top diamond.

In this one, we eliminated that second level of ventricular support struts because we wanted to keep the profile in the ventricle as low as possible. One of the ways around that was we were changing the wall thickness. So when we went from C to D, we actually changed the wall thickness of the tubing that we cut it from, so that made the D stiffer. So we didn't think it needed both the extra row of struts here and the additional wall thickness. We thought that just with the

wall thickness we could get the rigidity that we needed. So that was one of the things that we were trying to prove out in Rev. E.

We changed the shape of the ventricular anchors a little bit to be able to reach a little bit further away from the frame just to have more room to capture leaflets there. And that was probably the bulk of the changes there.

Q. Okay.

So did you issue another purchase order to Neovasc to help assemble the valve tissue portion of a Rev. E frame?

A. Yes.

Q. If you turn to Exhibit 156, is this an e-mail chain where you forwarded a purchase order to Neovasc in January of 2010?

A. Yes, that's correct.

Q. And if we go to page 5 of this exhibit, is that the purchase order itself?

A. That is.

Q. And the last page, page 6, can you tell us what we're seeing in this drawing?

A. This is a sketch that I made to communicate the concept for that bell-shaped or conical valve that we had called Mr. Randy Lane about in December. And this purchase order was to have them work on developing an assembly method for a valve of that construct.

Q. And again, who else had you shared this information about

this new valve design with?
A. No one else.
Q. Any information yet from Neovasc that they were working on a competing TMVI device?
A. No.
Q. Did Neovasc assemble valves that used this new design?
A. Yes, they did.
Q. Okay.
Let's turn to Exhibit 1199, please.
Did you learn that Randy Lane actually assembled mock-ups of prototype Rev. E valves and tested them at Neovasc?
A. From this e-mail, that's what I was made aware of, yes.
Q. And this was in January of 2010, correct?
A. That's correct.
Q. And this is the first time you're learning about the work that Mr. Lane was doing at Neovasc testing the prototypes, correct?
A. That's correct.
Q. And if we go to the middle of this first paragraph here, it's the sentence that starts, Once this prototype was assembled we loaded it into an acrylic mock stent according to your proposed stent design and tested it in our pulse duplicator. Can you tell us what you understand that to mean Mr. Lane was doing?
A. Yes. We hadn't requested any testing, but he had taken

the mock-up of the valve that they made, created, essentially, a silicone kind of reverse shape of what our frame would be so that he could put that prototype valve inside of it and then evaluate it in a pulse duplicator. So a pulse duplicator is kind of a realtime test for heart valves where you can vary the pressure, the flow rates, the volume, and basically assimilate a lot of physiological conditions that you might see in a patient. It's part of the standards, the regulatory standards that you evaluate heart valves in all these different conditions. I think there's about 20 different combinations of flow and pressure and rate that you have to evaluate these heart valves. So it's one of these things that as a heart valve developer you have to do at some point to understand your device and have the regulatory information for it.

Q. So had you asked Randy Lane to do this testing in the pulse duplicator?

A. We had not. I think the PO actually expressly said it was not required.

Q. So how did you feel about it when you found out that he went ahead and tested it?

A. At the time we were kind of excited about it. We thought, wow, this is great, they're sort of going above and beyond to evaluate our device for us and give us some feedback. So it was sort of a nice thing. Obviously different in hindsight, but --

Q. So did he do any other testing?
A. Yes. He came back and asked if we wanted more evaluation after that.
Q. So let's turn to Exhibit 1202, and this is an e-mail from Mr. Lane to you dated February 15, 2010.
What's Mr. Lane asking of you in this e-mail?
A. He's asking if we had any objections to essentially do that same kind of mock-up evaluation with a tissue version of the leaflets instead of a fabric version.
Q. Did you agree to allow him to do that?
A. I believe we did, yes.
Q. Was there anybody else that had access to the CardiAQ prototype frames to do this kind of testing?
A. No.
Q. Again, at this point that you're agreeing to the testing, had Mr. Lane told you anything about the work he was doing on a competing TMVI device?
A. No.
Q. At some point did you send more details about the Rev. E prototype frames to Neovasc?
A. Yes, we did.
Q. Were you ever holding back any technical details about how to design or build any of these prototypes?
A. No. Again, as with all of the revisions that we were working on and sort of the full iteration, we were trying to

update them in real time to keep everything moving. So as soon as concepts came up, we shared that with them. As soon as things were shifting or changing or developing further, we shared with them as we went to try to keep everything going in parallel.

Q. Let's turn to Exhibit 1216, please.

Is this an e-mail from you to Mr. Lane February 9, 2010?

A. Yes, it is.

Q. Can you tell me what you're attaching to the e-mail?

A. A number of different engineering files for flat patterns for various subrevisions of Rev. E. We had I think Rev. E-1, 2, 3 at least, so each of those is shown here with the exception of Rev. 1, I think I note was still in process.

THE COURT: I'm sorry, what's the exhibit number on that one?

MR. SGANGA: This is Exhibit 1216, your Honor.

THE COURT: Thanks, sorry.

BY MR. SGANGA:

Q. So some of these attachments, some of these files have the letters "DXF" at the end of them. Can you tell us what that means?

A. Again, that's another file type of an engineering drawing that has all that dimensional information in it. So the same thing that we were talking about before where everything can be

derived from that. You can cut your own parts from that, you can modify the drawings from that and cut your own different parts, whatever the case.

Q. Can you pull up a three-dimensional model of the frame from a file like this and view it on your computer screen?

A. You can. This is -- a DXF or DWG are both two-dimensional engineering drawings but you can import those into three-dimensional software and simply add thickness to it and then do all the other things you want to do, roll it up, expand it, whatever.

Q. If we turn to the drawings on page 4 of 7, these attachments here to Exhibit 1216, can you tell us what we have here?

A. This is an engineering print for the same information that's in the engineering drawing, so the DXF, the DWG files, where all the dimensional information is there. This is just a PDF of that showing all the relevant dimensions of the device.

Q. If we go to the next page, page 5 of 7, can you tell us what we're seeing here?

A. So on the left side it's showing the expanded geometry for that particular revision. So on the first page I would typically show the flat pattern, the dimensions for the flat pattern as it was to be laser cut, and on the second page I would show the dimensions as it was to be expanded in three dimensions after it's been cut.

Q. So now is this showing the detail of exactly how far away that ventricular anchor is supposed to spread out from the rest of the frame?
A. Yes. So on the bottom, it's a little faint here, but 4.5 millimeters. So we've gone about 25 percent bigger, you know, than the last one in Rev. D just to give more space here to reach out.
Q. And what was the purpose of getting more space between the anchor and the body of the frame?
A. Again, to have more room for the leaflets to collect there. We talked about how they would be plicated as you grabbed those and come up to the annulus. And so we're trying to make sure we reach out to get the annulus and that we have room for the leaflet material.
Q. Did you ever send to Neovasc Rev. E prototype frames that had all the features described here in this Exhibit 1216?
A. Yes, we did.
Q. How did those get to Neovasc? Do you recall?
A. I do. We were, again, working quickly, as we always tried to do. So when the frames were ready, there were a number that were made in Germany and we knew that it took time to get them shipped and through customs. We were sending overnight, but we had them divide up the order in half so that half were drop shipped straight to Vancouver to Neovasc and half were drop shipped to me. Actually, in this case, I think mine got held

up in customs so Neovasc actually got these particular prototypes before I did.

Q. Okay.

If we go to Exhibit 1205, is this an e-mail chain between you and Mr. Lane talking about those prototypes that you say got to Randy Lane before they got to you?

A. Yes.

Q. And was Mr. Lane asking about the prototypes themselves in this e-mail towards the bottom of the page?

A. Once he had received them, again, this is before I had held them, he was asking some questions. He said, Do you have any quantitative data on your crimping process? These iterations feel stiffer than your previous frames. Do you have a target value you're aiming for?

Q. So what did you understand Mr. Lane was asking about here?

A. I mean, he was asking about the, you know, radial stiffness of the frames, the circumferential rigidity of these frames, commenting that they were stiffer than the previous ones we had made.

Q. How could he tell anything about that stiffness?

A. You can -- I mean, if you have it in your hands, you can easily squeeze it. There's tests you can do as well, as he points out here, to get a quantitative assessment. But qualitatively you can easily tell with two frames in your hand which one is stiffer as you squeeze them.

Q. So quantitative we'd be talking about an actual number that an engineer would measure for this kind of thing?
A. Right. It's typically quantified as a hoop strength. There's a test that you can do to compress this circumferentially with a force gauge and measure that number. It's usually given in Newtons and it's something that you would use to characterize your frame.
Q. And when you say "qualitatively," that's holding it in your hand?
A. That's by feel. Say this one is a lot stiffer than the last one, like he's doing here. He had seen all the other frames. Rev. C was very flimsy, Rev. D was a little bit stiffer than C, not quite as stiff as these. These are the ones that we also had made with a variable wall thickness in some of these that he was receiving, too.
Q. So was there something intentional that you put in the design relating to this stiffness?
A. Yes.
Q. And so this both go by feel and go by numbers on hoop strength, how common is that in the development of a product like this that you as an engineer would look at both?
A. Absolutely. We're going off of, you know, feel first, and then if we need to, we would do further testing. But in a lot of earlier revisions we could look at it and say we don't have to do the test, we know we have to double the wall thickness,

we've go to make it stiffer in another way. You can get it stiffer through changing the strut width and changing the angles of these diamonds or the struts that you're expanding. As you make it a wider angle, it becomes stiffer; if you make it a shallower angle, it becomes easier to compress. So there's a lot of different combination of factors at your disposal to kind of change the response of the material of the frame.

Q. So let's go to the e-mail at the top here of Exhibit 1205. So you're responding to Mr. Lane after he's asking those questions. Did you give him information about some of the design criteria that you had for this Rev. E frame?

A. We did. So, you know, like we've talked about before, a huge part of this is being able to compress it into a catheter. We informed him here I think on the side here that what we're shooting for in the compression size is 25 French, that's equivalent to 8.3 millimeters in diameter. French size is just a way that the cardiovascular community uses to describe the diameter of a particular catheter. So the smaller the French size, the smaller the catheter diameter. It's typically about three times the actual diameter in millimeters.

Q. So the idea then is this frame that's 40 millimeters across when it's fully expanded would squeeze down into --

A. Less millimeters. About eight millimeters.

Q. At this point in time, again, did anyone else have access

to these physical Rev. E prototype frames other than Neovasc?
A. No.
Q. Was anybody else getting this kind of information outside of CardiAQ about the particular sizes of the catheters you were planning to use?
A. No.
Q. Was anyone else able to actually touch and feel the Rev. E prototype frames and assess how much stiffer they were than prior revisions?
A. No one.
Q. In this time frame, January/February '09, how was CardiAQ being funded?
A. Sorry, in 2010?
Q. I'm sorry, yeah, wrong year. So let me ask the question again.

In early 2010, how was CardiAQ being funded?

A. So in early 2010, actually, January 4, 2010, we closed on a Series A round of funding. It was our first equity round of funding. We had done convertible debt before that. So we had about a million and a half total in convertible debt, kind of a loan to the company, and then we raised $5 million in new money at that point. So all of that rolled into an equity round of 6.5 million.
Q. So what did do you with the new money?
A. Well, we did a lot of things with it. It was nice to have

that kind of money at our disposal, but one of the things that we did and one of the opportunities that came about through one of the investors in this round was we were made aware of a manufacturing facility, heart valve manufacturing facility, that we might be able to get a lease on in southern California. And so it was kind of a big decision to decide to move the company and go from being this virtual company to having a brick and mortar setup, and for me a big concept to sort of move from my house in Winchester to operating in southern California. But it was sort of this opportunity that was too good to be true. We didn't really need that 9,000 square-foot facility right away, but, you know, it's an expensive thing to try to create if it's not already set up to make heart valves, so we wanted to take advantage of that.

Q. So what did this mean for the prototype assembly that you were doing with Neovasc now that you would have this new facility that had some tissue processing capability ?

A. So we knew even towards the end of 2009 that this was kind of coming together and this opportunity was going to happen once we closed the round in January. And so we were aware of the fact that this was going to mean we were going to start to make these valves ourselves and build the asset within the company to be able to manufacture our own valves, and that long term it would mean that we would no longer need to work with Neovasc as a partner.

Q. So did you do anything to tell Neovasc about those plans?
A. We did. We made them aware of the fact that this was coming down the pike even before the end of 2009, and just told them that, you know, this is where we're headed and we still want to work with you as we're making this transition, but long term we're going to be doing this ourselves.
Q. Did you feel like there was anything in any of the contracts that you had with Neovasc that required that you tell them about your plans to have your own tissue processing?
A. No. We were just in good faith in trying to kind of facilitate the continuing business relationship and work through the transition as smoothly as we could.
Q. So what reaction did you get from Neovasc when you told them about these plans?
A. You know, initially they were supportive of it. I mean, I think they expressed in e-mails saying they were still willing to help and happy to support us how ever they could.
Q. If we go to Exhibit 358 and to page 3, top of page 3, is this an e-mail to you from Mr. Lane at Neovasc?
A. Yes, it is.
Q. And if we go to the middle of that. So we're on page 3 of 6, and -- Exhibit 356, please.

I'm sorry, I'm sorry. A little trouble seeing here.

Exhibit 358, page 3 of 6, and the paragraph at the top.

Okay.

So that paragraph that we're looking at there, that's an e-mail to you from Randy Lane, correct?

A. Yes.

Q. And if we go to the middle of that paragraph, there's a sentence that starts, If you are on the West Coast any time soon --

A. Yes. So he was just acknowledging that he knew we had talked about the fact that we were going to build a facility in California, mentioned some of the services that they still had, and said, If you're on the West Coast any time soon, I would recommend you take a short trip up to visit us, see what our capabilities are, and assess whether there's anything else we can do to help. It may even make sense to have ViVitro, which is another outside testing company, come over and test our testing requirements, et cetera.

Q. So this is after you have already told Neovasc that you are planning to open your own tissue facility and that eventually you're not going to need to use Neovasc to make the prototypes anymore; is that right?

A. That's correct.

Q. And did you take Mr. Lane up on his offer to go and visit Neovasc?

A. Essentially we did. I mean, I was on the West Coast very frequently and had started commuting back and forth at this

point from Winchester to California. And so I had suggested could we come up there and bring one of our new valve assembly technicians just to sit down with their valve assembly technician who was building these prototypes for us already and make sure we could, you know, share that information so that our person could come up to speed quickly on how they were assembling it.

Q. So you wanted your technician to watch Neovasc do what?

A. Just assemble our prototype.

Q. So that's what you had been paying Neovasc to do now all this time, right?

A. That's correct.

Q. And what response did you get from them?

A. I received, I think, an e-mail from Mr. Lane, the first one in this group --

Q. Page 1 of Exhibit 358. Is this from Mr. McPherson to you?

A. I'm sorry, Mr. McPherson, yes.

Q. And what did he tell you about coming up to visit?

A. Respectfully, he said that, you know, happy to continue to support us, but in the second paragraph there, However, we do not typically contract with customers to train them to in effect do what we do. Neovasc has invested significant time and effort in developing our tissue processes and associated vascular device and capabilities.

Q. So what was your reaction when you learned that

Mr. McPherson declined your request to come and visit the facility?
A. I was a little bit surprised because it did seem consistent with the business relationship that we had and what we had paid them to do. We weren't asking to see any of their proprietary tissue treatment or anything like that, we just wanted to have our technician sit in a room with their technician and see what it was that we were paying for and just make that transition. But, you know, at the same time, he offered to provide the detail assembly instructions, and we didn't -- we were hiring somebody that was very experienced in heart valve manufacturing and assembly, so we didn't push the issue. We felt like, we'll figure it out ourselves then and get her up to speed on our own.
Q. So you never did get to the Vancouver facility there at Neovasc then?
A. No, I never saw it.
Q. Now, if we look at the next paragraph here, and Mr. McPherson's e-mail starts, These things are proprietary to us and at the heart of our business, which is primarily based on developing long-term partnerships with our customers. Now, have you seen Mr. McPherson talk about partnerships with the customer before?
A. Even at this point, toward the end of our relationship it was the same language that had been used in the initial

introductory presentation back in June of 2009.
Q. Why don't we go to that presentation, that was Exhibit 349, we were looking at that yesterday. If we go to page 4 of 16.
Can you look at that bullet point, next-to-last bullet point, what does Mr. McPherson tell you there?
A. Again, we pride ourselves on providing exemplary service to our partners and being flexible in meeting their needs.
Q. So we're in February of 2010. Neovasc has just turned down your request to go visit the facility. Did you continue using them to work on your Rev. E prototypes?
A. We did. So we started the lease in our -- opened the doors to our manufacturing facility in California in the middle of February 2010, but we were still setting up and getting everything ready, so we continued to request that Neovasc assemble our prototypes and placed POs with them for that.
Q. At this point any reason to believe that Neovasc wouldn't continue to honor the Non-Disclosure Agreement that you signed with them in June of 2009?
A. No, no reason.
Q. When they told you thanks but no thanks to your request to visit in Vancouver, did they tell you it was because they were working on a competing TMVI device?
A. No.
Q. Now, did you issue any more purchase orders to Neovasc for

this prototype work?
A. We did.
Q. Why don't we turn to Exhibit 1211.
A. This is an e-mail that I had sent to Randy Lane, copying Brian McPherson with our purchase order.
Q. And is the purchase order the attachment at page 3 of 4?
A. Yes.
Q. Okay.
Now, this still has the Winchester address here. At this point in March of 2010 had you opened that facility in California already?
A. We had opened that facility, but at this point our headquarters was still out of my house in Winchester. Down the line, a couple of months later, I moved my family to southern California, but at this point we were still operating out of Winchester.
Q. So let's talk about what you were planning to do in that California facility as far as the tissue goes. Were you planning to compete with Neovasc?
A. No, we were not setting up any kind of contract tissue processing facility. We were simply going to process tissue and fix -- figure out how that tissue that we were going to use for our own valves.
Q. So the tissue you would use or make in that California facility, the plan was entirely to use it just on CardiAQ TMVI

products?
A. That's correct.
Q. And have you ever done anything differently out of that facility?
A. No. I think at one point we sold some leftover tissue, but that was -- that was the extent of it.
Q. Now, did Neovasc assemble the Rev. E frames according to the purchase order that we just looked at?
A. They did.
Q. And what did you do with those assembled Rev. E prototype frames?
A. We used those in an animal study in March of 2010.
Q. And how did those studies go? Were you able to observe how the Rev. E prototypes anchored in the animal --
A. Yes, we were.
Q. And did the anchors go through the chords and around the leaflets and engage the annulus based on your observations?
A. They did.
Q. Did you tell Neovasc anything about how those animal tests went?
A. Yes, I did.
Q. So if we go to Exhibit 1221, can you tell us what this is, please?
A. I don't think it's in mine.
This is an e-mail that I sent so Mr. Lane on Friday,

March 26th.
Q. And had you completed the first of these animal tests in Massachusetts at this point?
A. Yes, we had.
Q. And had Mr. Lane asked you how the animal tests were going?
A. He did.
Q. And is that at the bottom of this e-mail chain here?
A. Yes.
Q. "How did the animals go?" That's from Randy Lane?
A. Correct. Just earlier that same day.
Q. And what information did you respond to Randy Lane about as far as how the Rev. E prototype performed in the animal study in March of 2010?
A. I mentioned to him that the implant looked very good, excellent engagement with the leaflets and annulus, no outflow tract obstruction, good seal around the annulus and chordae tendineae remained intact.
Q. What did you mean by this?
A. I was trying to describe the fact that of exactly what we had done of engaging the leaflets. So that was creating that engagement with the leaflets and the annulus, going behind and in between. The fact that we had no outflow tract obstruction, again, that was because we had captured that leaflet. The good seal around the annulus was from the native leaflets, and now

that we're grabbing these leaflets and pulling up on the chords, again, we want to make sure they're staying in tact and not breaking anything, so I was trying to communicate what we had seen.

Q. So how soon you after you actually did the tests where you got that good engagement with the anchors did you pass this information along to Randy Lane?

A. I think it's within a couple of days. I don't recall the exact date. I think it was March 20th or so that we did the animal, so just after.

Q. Now, at some point did you stop working with Neovasc?

A. We did. In April I think we had them make a couple more valves for us, but shortly thereafter --

Q. Now, did you ask Mr. Lane to return anything to you?

A. We did.

Q. What did you ask for him to send back?

A. At that point we thought that they only had a couple of the Rev. E frames, we asked them to return those to us.

Q. Okay.

And Exhibit 334, can we turn to that?

Is this an e-mail chain also between you and Randy Lane in late April 2010?

A. Yes, it is.

Q. And what does Mr. Lane tell you about the prototypes in their possession?

A. At that point I think I had asked for him to return those frames. He indicated in the e-mail here that's all we had of yours.
Q. And what did you understand that to mean?
A. That there was nothing else of CardiAQ's property in physical prototype form there that they had in their possession, so there was no need to ask for anything else. He said that those were sent out.
Q. So April 28, 2010 was the date of this e-mail. Is this the last of the e-mails you had with Neovasc regarding the work they were doing to help CardiAQ assemble prototypes?
A. Yes, I believe it was.
Q. Now, the NDA -- strike that.
April 28th now, 2010, this is the end of that relationship. Just to confirm, at that point had anyone at Neovasc told you that they were working on a competing TMVI device?
A. No.
Q. How did you learn that Neovasc was working on its own TMVI device?
A. I didn't learn until a couple of years later, after their patent application was published, and I think Dr. Quadri talked about the phone call that we had. It was late December 2011 when it became published and we discussed it at that time. And of course we were shocked to find out what had happened.

Q. So let's turn to Exhibit 253.

Is this an e-mail from Dr. Quadri to you about that Neovasc patent filing?

A. Yes, it is.

Q. And it's dated December 26, 2011?

A. That's correct.

Q. So if we turn to the next page in the exhibit, is this the cover page of a published international patent application?

A. Yes.

Q. And could you tell from this that it was filed by Randy Lane listed as the inventor?

A. Yes.

Q. And does this -- how did Dr. Quadri come across this? Do you know?

A. I think just in the course of a normal patent search. I think he mentioned yesterday it may have been flagged by his neighbor who was also somebody who was on the board of CardiAQ.

Q. Now, in the upper left here, does this indicate on the first page of Exhibit 253 when the publication was issued, when this patent published?

A. Yes, November 10, 2011, so a little over a month before, so just recently when we saw it.

Q. Did you look at the designs that were described in the patent application?

A. We did.

Q. And --
A. We talked through it together.
Q. Did you think that it related to the work that you did with Neovasc?
A. Absolutely.
Q. What would you have done differently had you known that Neovasc was working on this?
A. A lot of things, I guess. I guess it depends when we found out they were working on it. If we knew it ahead of time, we never would have gone there. If we found out about it during the course of our relationship with them, we would have left and found another avenue. We wouldn't have continued to share confidential information with somebody that was directly competing with us.
Q. So can we tell from this page that we're looking at, page 2 of Exhibit 253, when the patent application was first filed?
A. Yeah, on line 30, the initial priority date was May 5, 2010.
Q. So that was how long after your relationship with Neovasc ended?
A. I think less than a week.
Q. And this patent application that published altogether -- the exhibit's about 100 pages long; is that right?
A. Yes.
Q. So do you think that -- based on your experience working

on patent applications, how long does it normally take to write up a hundred-page patent application?
A. It takes several months.
Q. So did you think that meant that Mr. Lane was working on these designs while you were working with him?
A. Absolutely. I didn't think they put this together in a week. It was pretty clear that they had been working on it while they were working with us and never said anything.
Q. So did this end up issuing as a United States patent at some point?
A. It did.
Q. And if we go to Exhibit 565, is that the U.S. patent that issued naming Mr. Lane as the inventor?
A. Yes, it is.
Q. And if we go to the list of inventors on this patent application, line 75, who does it list?
A. Mr. Lane and Mr. Nyuli.
Q. Did you work with Mr. Nyuli?
A. No.
Q. But he's another engineer at Neovasc?
A. Yes.
Q. And if we go to the second page here of the Neovasc patent, Exhibit 565, there's a list of references cited. Do you have an understanding what that means in the patent application process?

A. I do. It means that they're relying on some of this prior art as something that they're saying taught them and educated them or supporting what they're expanding upon here.
Q. So on the lower right, there's a number of things listed under the heading "Other Publications." Do you see that?
A. I do.
Q. And were you here when there was some questions of Dr. Quadri about whether this list included some of the presentations that were made about -- by CardiAQ or about the CardiAQ TMVI device, correct?
A. Yes.
Q. And so is there anything in the list of those publications or the publications themselves that you're familiar with that reveals that Neovasc was working with CardiAQ to help build the prototype CardiAQ products?
A. No. I think they've carefully cited a lot of the CardiAQ material that was presented publicly, but there's no mention of the fact that we worked together for ten months leading up to this submission.
Q. Anything mentioning the fact that you had shared confidential information with Neovasc under an NDA?
A. No mention.
Q. Is there any indication from this list of publications that you and Dr. Quadri had made a claim that you believed you should be named as co-inventors on the patent?

A. No. I think if we go back to the first page, this patent, you know, was issued November 12, 2013, so it issued before we even filed the lawsuit that we're here for.

Q. Now, is there -- based on your experience with patents -- and how many patents have you had issued in your name as inventor?

A. We've got seven or eight right now through CardiAQ.

Q. So based on your experience with patents, do you understand that there's a portion of the patent that identifies what's claimed as the invention?

A. Correct.

Q. And is that towards the very end of the patent itself?

A. Yes.

Q. And it's a list of numbered paragraphs at the end of the patent, right?

A. That's correct.

Q. And have you reviewed patent claims before as part of your work with CardiAQ?

A. I have. I've reviewed them as we've submitted our own inventions, I've reviewed other patents during the course of due diligence and made assessments of that for potential investors. So it does come up fairly frequently.

Q. Have you reviewed the claims in this Exhibit 565 patent filed by Mr. Lane to assess whether those claims describe confidential information that you shared with Neovasc while

they were working with you?
A. Yes, I have.
Q. And have you reviewed these claims to assess whether you and Dr. Quadri made significant contributions to the features that are described by those claims?
A. Yes.
Q. And what did you conclude?
A. I think a number of these claims are derived directly from the information that we shared with them.
Q. Okay.
I'd like to go into a little more detail about the wording in those claims.
Can we go to PDX 3.10, please?
And is this the wording from claim 1 of the CardiAQ -- I'm sorry, from the Randy Lane patent on the left. Is that the wording from claim 1 of the Randy Lane patent?
A. Yes.
Q. And on the right, what's the image of there?
A. That's an image of one of our Rev. E prototypes.
Q. And those were made before the May 5, 2010 patent filing date, right?
A. Yes, they were.
Q. And so does the claim that calls for a method of anchoring a prosthetic valve in a patient's heart, is that something that the Rev. E prototype did?

A. It certainly did.
Q. And is that something that you communicated to Neovasc before May 5, 2010?
A. Yes.
Q. Let's go to the next demonstrative exhibit. The highlighted language refers to an anchor having an atrial skirt in claim 1 of the '964 patent. What did you understand that to mean?
A. So there's a little bit of a shift in the naming of the nomenclature here. How we describe things as a frame, they're calling the metal portion an anchor here. But it's the same construct.
Q. So when they say "anchor," they mean the whole metal frame?
A. Correct.
Q. Okay.
And what does the atrial skirt refer to in the claim.
A. Atrial skirt is the left atrial portion of that frame. So in this case "skirt" is actually referring to a portion of the frame, not a fabric or tissue component as we had described it before in our prototypes.
Q. So what is highlighted in red there in the image on the right?
A. That's our left atrial anchor region, which would correspond to the atrial skirt portion of an anchor, of a frame

that they're talking about here in claim 1.
Q. Was that in the prototype designs that you communicated to Neovasc before May of 2010?
A. Yes, it was.
Q. So let's now go to the PDX 3.12. And the highlighted language refers to an annular region. Can you tell me what you understood that to mean?
A. Yes. An annular region of the frame or of the anchor in this case, and this is the portion highlighted in red here on the CardiAQ device, that's the portion that sits intra-annularly. And you can tell that because it's the part between the two sets of opposing anchors here that is meant to be in contact directly with the annulus.
Q. And is that what's highlighted in red?
A. Yes.
Q. So it's the part of the frame that's just inside the anchors?
A. That's correct.
Q. Okay.
And is that something that was included in the designs that you shared with Neovasc before May 2010.
A. Yes, it was.
Q. If we go to the next PDX 3.13, the language highlighted in claim 1 is a ventricular skirt. Can you tell us what that refers to?

A. Yes. Again, it's the portion of the frame that sits in the left ventricle below the annular portion.

Q. And what does that correspond to in the Rev. E prototype shown here?

A. It's the red portion here that has that lower ventricular support strut as well as the left ventricular anchors as we call them.

Q. And these are features again that were in your Rev. E prototype?

A. Yes.

Q. Communicated to Mr. Lane before May 2010?

A. Yes.

Q. And these were things that you and Dr. Quadri designed into your prototypes?

A. That's correct.

Q. If we go to the next slide, 3.14. The highlighted language refers to a plurality of valve leaflets. What does that refer to?

A. The actual tissue valve that sits inside the frame.

Q. And were there tissue valves that were inside the frames of the prototypes that you designed?

A. Yes, there were.

Q. If we go to the next slide 3.15. The highlighted language refers to a first trigonal anchoring tab disposed on an anterior portion of the ventricular skirt. Can you explain

what that means?
A. Yes. It's referring to the ventricular anchor, a ventricular anchor that contacts a fibrous trigone.
Q. So the term here is "tab," "anchoring tab." Does that correlate to the anchor in your device?
A. Right. They refer to it as an anchoring tab, we just refer to it as an anchor. And they refer to their whole frame as an anchor, we refer to it as a frame.
Q. So what does it mean to be on the anterior portion of the ventricular skirt?
A. The anterior portion becomes the anterior portion once it's implanted. It's only anterior with respect to the anatomy that it's in.
Q. Can you shows us on that heart?
A. The anterior portion is this side. So you've got an anterior leaflet here and a posterior leaflet here and a mirror image on the part that's cut away from the heart here. So anterior is towards the front, posterior is towards the back.
Q. What about being a trigonal, a trigonal anchoring tab, is there something on the Rev. E prototype that you shared that is a trigonal anchor?
A. We consider it. Again, we don't give it a specific name, and this is just a naming aspect to it. But once it's implanted, it lands on a trigone, it can be whichever one that lands on the trigone, that would be a trigonal anchoring tab.

But it's not specific as to which one it needs to be.
Q. Now, the way this claim 1 is written in Randy Lane's patent, does it say how many anchors there are total in the device?
A. No, just describes that there is a trigonal anchoring tab, a first trigonal anchoring tab. It doesn't say whether there's more anchors or there needs to be more anchors, it's not specific to that.
Q. Does it say there's got to be three or can't be more than three?
A. No.
Q. So now did you ever actually -- you used the word "trigone" in communicating with Randy Lane, did you tell him our anchors hit the trigones?
A. No, I don't think we used those words with Mr. Lane.
Q. Do you think Mr. Lane would have been able to understand that that was the way your device worked?
A. I do.
Q. And why is that?
A. Well, I think he was an experienced engineer. He had worked in the heart valve space for a number of years. He, you know, we've already heard designed a surgical or worked on a surgical mitral valve, so I presume he was familiar with the anatomy. I think based on what we know now, I think he was even more familiar than that.

Q. So were you telling Randy Lane that the device was anchoring on the annulus?
A. Yes.
Q. And what about the trend in the design changes that you made, would that have communicated anything about the way the device anchored?
A. I do. I think it's very clear the progression that we had of having the skirt come around, getting rid of that skirt, communicating the results of that animal study in terms of what we changed there and the fact that skirt never returned. We were very conscious of the leak prevention, that was the whole reason for the skirt. Now we're doing this a different way where we don't need the skirt to have the leak, and that's happening from being behind the leaflets.

The communication even after that March animal study where we made it clear that we had engaged the leaflets in the annulus, we had a good seal, all of those things I think would have made it very clear to Mr. Lane over the course of that several-month experience what we were doing.
Q. Now, let's go to the next slide here, which has the claim 1 language.

It says that -- let's go back to the prior one here.

(Discussion off the record.)
Q. We don't have this up on the slide, but one of the terms in the patent is positioning the prosthetic valve in the

patient's heart. Do you think that's something that you communicated to Mr. Lane?
A. Yes. I think it was clear that we were putting this in the patient's heart.
Q. Now, we've talked about the trigones here, and was there anything that you saw in claim 1 about aligning the particular tabs or anchors in the device so that it was targeting a particular trigone?
A. No. There's no discussion of any need or requirement for alignment here, just that it has an anchor that's on a trigone.
Q. Now, is there a place in the patent that does talk about that idea of aligning, rotating the Neovasc device in a particular way so that a particular anchor hits a particular trigone?
A. There is. I think there's a dependent claim towards the bottom that list that discusses the ideas for alignment.
Q. Are you of the view that you and Dr. Quadri should be co-inventors on the dependent claims that talk specifically about aligning the device so that a particular anchor hits a particular trigone?
A. No, that was not something that was necessary with the CardiAQ device. It was not something that we came up with or really had any desire to incorporate in a device. We wanted to keeps our symmetric and skip that step and skip any need for alignment. So that's not something we believe that we

contributed to this.
Q. But claim 1, you're saying, is -- is broader and doesn't get into the specifics of how many anchors or exactly where each anchor goes, other than that there's at least one hitting a trigone?
A. That's correct.
Q. And that's something you believe your Rev. E device incorporated?
A. I do.
Q. Okay.
Let's go to 3.16, please.
And the language from claim 1 here refers to the anchors having a collapsed configuration for delivery and an expanded configuration for anchoring. Do you see that?
A. Yes, I do.
Q. Can you tell us what in the CardiAQ device, if anything, corresponds to that?
A. Yeah, again, it was very clear that we were compressing this down. We communicated to Mr. Lane that we wanted to get this inside of an 8.3 millimeter catheter, and it was to expand to the full size of its shape set as we had the valve assembled to it, so I don't think there's any mystery that this was going to be compressed and expanded.
Q. So what are we seeing here in the images on the right-hand side. Are those things that you sent to Mr. Lane?

A. Yes. Those are some of the drawings, engineering drawings, that we had sent before where you see the compressed state as it was laser cut from the tube and that compressed size and what that expanded configuration would be of the anchors.

Q. Why don't we go to the slide 3.17. And the language here from claim 1 of Mr. Lane's patent says, Expanding the atrial skirt radially outward so as to lie over a superior surface of the patient's native mitral valve and anchoring the atrial skirt against a portion of the atrium. Is there anything you believe you contributed with the CardiAQ device to do what that claim language describes?

A. I do. I think that's exactly how our left atrial anchors function. They expand radially outward over the superior surface of the mitral valve and anchor that skirt or those left atrial anchors against a portion of the left atrium.

Q. When you say "left atrial anchors," I just want to be clear, are there right atrial anchors, too?

A. Not on our device. We're working this space where we've got a portion of the device in the left atrium up here and a portion that's sitting in the ventricle here and a portion that's intra-annular. So these left atrial anchors are expanding over the native mitral valve and extending on the floor of the left atrium.

Q. So they're the upper anchors that are highlighted in this

chart here?
A. Yes.
Q. You're calling them "left atrial" because they're all in the left atrium?
A. Right. As we see it on the screen.
Q. Okay.
Let's now go to 3.18. This is more language from claim 1. It says, Radially expanding the annular region of the anchor to conform with and engage the native mitral valve annulus. Is there something like that in the CardiAQ prototypes?
A. Yes. The region that we saw highlighted before, the top side of the diamonds in that space in between the two sets of the upper and lower anchors, that is the annular region of our frame as well, and that's what expands to conform to the native annular, intra-annular anatomy.
Q. How does it conform? Does it --
A. It expands radially. That annulus is compliant, and so it's -- both the frame and the annulus are kind of changing shapes to match one another. You know, it all depends on how much stiffness you've got in the circumference of the frame, whether you take on more of the annulus shape or you take more on the frame shape and there's kind of a balancing between the two as they come out to meet each other. But that's part of the leak prevention is making sure that you've got a seal

inside that annulus.
Q. So does the claim actually say that the shape of that region in the device has to be D shaped?
A. No.
Q. So your device, even though it's cylindrical, will conform to the patient's annulus once it's in place?
A. Yes.
Q. Again, are there other claims in Randy Lane's patent that talk about having a flattened side or a D shape?
A. Yes. There's some, again, dependent claims further down that do discuss that.
Q. And is it your position that you're a co-inventor on those claims?
A. Not in this case. We had published applications before where we talked about D shapes and non-circular cross-sections for our device, you know, long before this, but that's not something we're suggesting is an invention that we --
Q. You didn't contribute -- you didn't tell Randy Lane at some point make the device D shaped?
A. No.
Q. But his claim in claim 1 isn't requiring that it's D shaped, right, it can be any shape that conforms?
A. That's correct.
Q. All right. Let's go to 3.19, the slide, please.
Can you tell us what this refers to?

A. This is discussing anchoring against a first fibrous trigone on the first side of an anterior leaflet of the native mitral valve such that the anterior leaflet in the adjacent chordae tendineae are captured between the trigonal anchoring tab and an anterior surface of the anchor. So, essentially, it's just saying you're going between the chords and behind the leaflet.

Q. Is that something you came up with in your designs of your prototypes?

A. Yes.

Q. And did you communicate those prototype designs to Mr. Lane before the May 2010 filing date?

A. We did.

Q. Let's go to the next segment of this claim 1 language on late of slide 3.20.

It refers to radially expanding the ventricular skirt. Did you have a ventricular skirt in the prototypes you sent to Mr. Lane?

A. We did. Again, reminding everyone that we refer to it as ventricular anchors, they're referring to skirt here as a portion of their fame or their anchor as a whole, but it's the lower portion of the diamond and the left ventricular anchors or lower anchors as we call them.

Q. So how significant do you believe your and Dr. Quadri's contribution was to all of those features that we've just

walked through in claim 1 of Randy Lane's patent?
A. I think it's hugely significant. I think it was, you know, the underlying factor of everything else that's here.
Again, we're not saying that we contributed to each one of these dependent claims, but I think you can see our inventions and our art in this first depend -- or independent claim, sorry. So I think it's what led to everything else.
Q. And that information that you conveyed to Mr. Lane regarding these features in claim 1 that we've just talked about, are those things that you considered to be confidential information that you were communicating under the Non-Disclosure Agreement?
A. We did during the course of that relationship.
Q. And did anyone at Neovasc ever ask you for permission to file a patent application describing those features or claiming them as inventions?
A. No.
Q. So I want to talk briefly about some of the dependent claims. Let's go to slide 3.21. This is claim 2.
Can you just start by explaining to us what this means to be -- when the claim says, The method of claim 1?
A. So it's a dependent claim. The claim 1 that we just saw is an independent claim, it doesn't refer back to anything else. It's what it is in its entirety. A dependent claim like this one that refers back to the method of claim 1 basically

encompasses all of claim 1, all of the information that described in that plus this extra information that follows. So it's kind of a subset of what's shown in the claim 1.

Q. So it's claim 1 plus what's here in claim 2, and what's here in claim 2 is a prosthetic valve covered with tissue or a synthetic material?

A. Correct.

Q. So that's either the skirt or the animal tissue?

A. Correct.

Q. And the prototype frames that you communicated with Neovasc about had that kind of covering?

A. They did.

Q. So is the -- is the invention just the idea of using a tissue or fabric covering?

A. No, it's the -- the invention is using a tissue or fabric covering on top of everything that's described or inside of everything that's described in claim 1.

Q. And the prototypes you sent or described to Neovasc and had them assemble had the combination of what's in claim 1 and claim 2 together?

A. They do.

MR. FLYNN: Objection. Your Honor, may we approach briefly?

THE COURT: Yes.

(At sidebar on the record.)

MR. FLYNN: We have not been objecting to move things along, but these are a series of legal conclusions with respect to issues that aren't being tried to the jury.

He's testifying as if we were a lawyer at a claim construction hearing making an argument.

I don't want to interrupt and get overruled and obstruct the flow of the examination, but it's all inappropriate.

THE COURT: Yeah, I mean, I don't agree that it's all inappropriate, and I think what he did on the first thing, sort of going through the claims and comparing to what you had in your device was proper, but having him testify about the difference between the dependent and independent claims is going beyond --

MR. SGANGA: Well, we didn't object yesterday, your Honor, when the cross-examination was to isolate the dependent claim and suggest that the tissue alone was the invention. We've got a witness here who's familiar with patents and he --

THE COURT: Can you show me the last question?

(Pause.)

THE COURT: So I think him eliciting testimony that the invention is the tissue and the frame is appropriate. That was the first question.

The next question was basically that prototypes are the tissue plus the device, I think that's okay.

But then when you start to get into the idea of what's in the patent is a combination -- the device is a combination of the independent and dependent claims, you're getting -- you're very close to the line, if not beyond, what's appropriate for him to testify to.

You can't make legal conclusions about the patent. He can talk about the device and the language, but he can't make the legal conclusions that follow. Okay?

MR. SGANGA: Understood.

MR. FLYNN: Your Honor, can I make one more point briefly?

THE COURT: Sure.

MR. FLYNN: Further to the objection, we think this exacerbates the problem of juror confusion. This is being tried -- this issue is being tried to the bench. Inventorship is a matter for the Court, and this examination, these questions in particular, don't relate to trade secret liability. So the ability for the group of lay people to distinguish between those concepts promotes juror confusion that we think is a problem.

THE COURT: I don't think it promotes juror confusion. They don't know there's an inventorship claim being tried to the bench. What he's doing -- I saw he's getting close to the line at this point. What he's doing is trying to show the similarities between their device and what's included in the

patent, and that's relevant to the trade secret claim.

MR. FLYNN: Thank you, your Honor.

THE COURT: Don't go any further, though. You've hit your limit on that on the legal conclusions, okay?

MR. SGANGA: Thank you, your Honor.

(End of discussion at sidebar.)

BY MR. SGANGA:

Q. I'd like to turn now to claim number 3, which is the slide PDX 3.22.

Mr. Ratz can you tell us what claim number 3 refers to as far as a feature on a TMVI device?

A. Yes. It just talks about, again, the method of claim 1, where the positioning of the prosthetic valve comprises transseptally delivering the prosthetic valve from the right atrium to the left atrium of the heart.

Q. And we've had a bunch of medical terms for the delivery. Can you tell us what "transseptally" means?

A. It just means you're coming in through the leg and you come up through the right side here, you puncture behind these two vessels between the right atrium and left atrium, and you deliver the valve this way with the blood flow.

Q. And sometimes we talk about that with the term "transfemorally," is that the same thing?

A. Correct.

Q. So that's coming up through the leg with a catheter?

A. Correct.
Q. So did the designs that you were working on with Neovasc, those prototypes, did they have that capability as something that you were designing into them?
A. Yes.
Q. Have you in fact -- strike that.
So that feature, as well as the features referred to in claim 1 together would be in the Rev. E prototypes?
A. Correct. That's what we did in the April 2010 animal study.
Q. And are you aware of whether Neovasc has ever actually used that transfemoral procedure to deliver its Tiara device?
A. My understanding is that all of the patients that they've done to date, all the animal work they did was transapical.
Q. And explain the difference?
A. Transapical, again, is coming through an incision in the chest wall and entering the mitral annulus from the opposite direction through what's called the apex of the heart, so we call it "transapical." But it's a short catheter approach through the wall of the chest between the ribs.
Q. And so this idea of using your device transfemorally, is that something that you believe had ever been communicated to Neovasc before May of 2010?
A. Yes.
Q. Let's turn to claim number 14, slide 3.23 in the patent.

I've got a lot of wording here, so can you walk us through what you understood claim 14 to refer to?
A. Yes. Again, it's referring back to the same concept described in the first claim that we went through in detail with the addition of another ventricular anchor that contacts the posterior side of the annulus. And so, again, one that has one anchor on the trigone or on a trigone, and then at least one anchor on the posterior side of the annulus behind the posterior leaflet.
Q. So this the first time in these claims that you're seeing a reference to more than one anchor being called out?
A. In what we described here I think claim 13 talks about a second trigonal anchor, but this is the first we hear of a third, and it's the first we hear of any anchors that are not on the trigone.
Q. Again, any kind of indication from claim 14 that there's a total number of anchors specified the way you understand it?
A. No. It doesn't limit the number of anchors that could be on the device.
Q. And in the Rev. E prototype designs that you communicated to Randy Lane, were there anchors that could be both on the trigones and on this annulus by the posterior leaflet?
A. Yes.
Q. Let's turn to claim number 18 and the slide PDX 3.24.
Can you tell us what this adds to claim 1?

A. Yes. It just talks about the fact that the ventricular side of the frame would expand and in doing so would push the native leaflets outward to keep them away from the prosthetic leaflets. So, essentially, as these lower portion of the frame expands, it's pushing the native leaflets away so that they can't come in contact with these prosthetic leaflets inside here.

Q. And is that something, is that feature something that was embodied in the Rev. E prototype designs that you communicated to Mr. Lane before May of 2010?

A. Yes.

Q. Let's go to slide 3.25.

This refers to claim 19 in Mr. Lane's patent.

Can you tell us what feature this is adding to claim 1.

A. It's talking about what happens to the displacement of the native mitral valve leaflets from the opposite side. So the previous claim talks about how it pushes them way. If I go to the poster over here, how it pushes them away from the center. This claim talks about how it prevents them from being pushed against the side of the heart. And so that happens in our design by having them captured between the frame and these ventricular anchors.

Q. And what's captured you're referring to is the leaflets?

A. The leaflets.

Q. Again, is this something that was contained in the prototype designs that you communicated to Neovasc before May of 2010?
A. Yes. And again, not just the ventricular wall here, but also the left ventricular outflow track on the opposite side, which, again, we communicated.
Q. So let's go to claim number 26, slide 3.26. And is this referring to now the positions of the leaflets in the prosthetic valve?
A. It is. Again, the idea of having a functioning prosthetic valve is described here, which in and of itself is not anything new. There's been functioning prosthetic valves for many, many years, but it's describing it with the combination of the claim 1. So it's everything encompassed in claim 1 that has also a functioning prosthetic valve inside of it, which is something that we described.
Q. And that's something you described to Mr. Lane before May 5th?
A. Yes.
Q. And was that embodied in the prototype designs that Neovasc helped fabricate?
A. Yes.
Q. Okay.
One more here, claim 27, slide 3.27.
Can you tell us what claim 27 adds?

A. Again, a dependent claim that references claim 1, as we've been talking about, that further comprises reducing or eliminating mitral regurgitation, which is exactly what we set out to do with all the features that were described in claim 1.
Q. Okay.
So let's move on to the trade secrets.
After this lawsuit was filed, did you help put together a list of the trade secrets that was -- that were communicated to Neovasc during the course of the 10 months that you worked together?
A. Yes, I did.
Q. And if you can identify Exhibit 1157 for us, that's that binder that you have there.
And is Exhibit 1157 the document that you helped prepare listing trade secrets?
A. Yes.
Q. And these are the trade secrets being alleged in this lawsuit?
A. Correct.
Q. And how many trade secrets did you identify in Exhibit 1157?
A. There's six total.
Q. And can you tell us generally what each one of those trade secrets corresponds to?
A. Sure.

So the first one describes the Rev. C prototype design, and by prototype design we mean the Rev. C embodiment in its entirety, as it's represented by the physical prototypes by, by the photographs, the design drawings, all the other information that was communicated to Neovasc over the course of that revision.

Q. Now, there's a number of attachments that are referred to here with letter designations on them. Can you tell us what those are generally?

A. Yes. AN through AQ, and then up to CJ in the list there. These are the communications that we had with Neovasc, mainly that I had with Neovasc, sharing this information through the course of e-mails and the attachments to those e-mails, just to make it clear what was shared with them.

Q. So was that some of the same information that we've been going through in your testimony here?

A. Yes, a lot of the e-mails and attachments we've talked about already.

Q. Okay.

So in this Exhibit 1157 document, they're referred to by letter numbers. These correspond to the exhibits numbered 1158 through 1188; is that correct?

A. Yes.

Q. And then also Exhibit 1219, corresponds to attachment CJ?

A. That's correct.

Q. And then there's a number of subparagraphs it, lettered subparagraphs here in this trade secret disclosure number one. Can you tell us what those are referring to?
A. They're just highlighting some of the design features, at least the following design features is how it's written, again, indicating a subset of those embodiments or those features that were representative in the Rev. C design.
Q. And is it -- are all of the subtleties that are described here in this document, are they things that were in the Rev. C prototype?
A. Yes.
Q. And were these all things that got communicated to Neovasc?
A. They were.
Q. And did you understand that these were all being communicated under the Non-Disclosure Agreement?
A. I did.
Q. Let's turn to the trade secret number 2, it starts at page 5 of Exhibit 1157.
A. So, similarly, trade secret number 2 represents the Revision D prototype design in its entirety, again, as communicated by physical prototypes, e-mails, the attachments to those e-mails, all that we, you know, discussed already, and others.
Q. Okay.

If we go to the next page in Exhibit 1157, again, we've got a list of a bunch of lettered attachments. I just want to be clear that those attachments with the letter labels BU through CI, do those correspond to those exhibits we have in? Your book there, 1204 through 1218.

I'm sorry, I gave you the wrong letters there.

So in trade secret number 2 regarding Rev. D, those attachments BE through BQ that are referenced, do those appear as Exhibits 1188 through 1200?

A. Yes, they do.

Q. Now, were all of those -- now, there's more subelements here listed in trade secret 2 as well, right?

A. Correct.

Q. Are all of those in the Rev. D prototype designs that you sent to Neovasc?

A. All but one, actually. I think the Roman Numeral a ix or -- discusses a wall thickness of struts as the frame as measured radially is greater than the width of the struts --

(Reporter interrupted.)

Q. We're on page 7 here of the exhibit?

A. Yes.

Q. It's IX there.

A. I'll speak more slowly.

A wall thickness of struts of the frame as measured radially is greater than the width of the struts as measured

circumferentially. That one actually I believe was a mistake. That one did not show up until Rev. E, so that was just inadvertently placed in D here by mistake.

Q. But this feature in ix here, is it a feature you did come up with?

A. We did, we disclosed to them with the Revision E.

Q. So the rest of the subelements in number 2, were they all in Rev. D?

A. Yes, they were.

Q. Okay.

Let's go to the Rev. E prototypes. How does, if at all, trade secret number 3 in this disclosure document, Exhibit 1157, how does that relate to the Rev. E prototype?

A. Again, trade secret 3 corresponds to the Revision E family of prototype designs as encompassed by the physical prototypes, the engineering drawings, the e-mails that we shared with them, all the supporting documentation.

Q. Again, there's a reference to attachments BU through CI. Do those lettered attachments correspond to Exhibits 1204 through 1218?

A. Yes.

Q. Let's turn to what was disclosed as trade secret number 4, which starts at this bottom of page 14 of Exhibit 1157. Can you tell us what that relates to?

A. Trade secret number 4 represents specific features that

were disclosed to Neovasc during the course of the relationship, so not restricted to a particular revision family, but just a subset of features that were disclosed.

Q. And how many of those features are there in this trade secret number 4?

A. I believe there's six.

Q. And were -- is there some common theme to those particular features that were identified?

A. These are all features that we believe actually were used in the Tiara design.

Q. And were they things that you worked on and developed during the course of the prototype revisions that you shared with Neovasc?

A. Yes.

Q. And can we just talk about generally what those features are?

Is there one of them relating to the ventricular anchors?

A. Yes. The first subsection a is ventricular anchors that extend between the chordae, capture the native leaflets, and engage the ventricular side of the native mitral annulus.

Q. And then there's a second one.

A. Subsection b, which is variable strut dimensions, which corresponds to what we spoke of earlier about having a variation in the wall thickness of the tubing, such that one

area of the tube may be stiffer than another area of the tube or of the expanded frame so that you can get different properties intra-annularly versus in the section above that just to better correspond to -- or better function in the dynamic environment of the heart.

Q. And then trade secret 4, element c, what does that refer?

A. A lower atrial profile, the fact that we were continuously reducing the height in the atrium and learning from that in the animal studies in order to avoid contact and minimize that height.

Q. And then subsection d of trade secret 4, what does that encompass?

A. That's the larger ventricular cross-sectional diameter. So what we talked about, the change that we made partway through Revision D, where we made that two-level design so that the top side was smaller, the bottom side on the ventricle was larger in diameter.

Q. Let's go to page 17 then and refer to element e of trade secret 4. What does that describe?

A. The V-shaped atraumatic anchors. These V-shaped anchors that started in Revision C that extend radially outward from the frame and contact one side of the other of the native mitral annulus.

Q. And then element f of trade secret 4, what does that refer to?

A. These are the mushroom-shaped locking tabs, specific tabs that are designed to be atraumatic on one side but to have the flat surface on the bottom side of the mushroom to maximize the contact area of the delivery system so you can restrain that force as you pull back a sheath that constrains this nitinol material that wants to expand, so it wants to jump out. So you need to have some function in the delivery catheter so that as soon as you pull it back it doesn't just explode and embolize in the heart. So you need to have that control. So we wanted to rather than just have a round tip or some other function, having that flat surface of the mushroom allowed us to maximize that surface contact so that we could get more control in that deployment.

Q. Now, were all of these six subelements of trade secret 4 ever combined in a single prototype that CardiAQ designed?

A. Yes, they were represented in Revision E.

Q. Now, I noticed that there's -- okay, let's go to trade secret number 5 here.

The first is the mandrel. Can you explain what that is?

A. This is the assembly mandrel tool that was passed around yesterday, that was something that we came up with and shared with Neovasc.

Q. And these attachments AF and AI, are those Exhibits 1163 and 1166?

A. Yes.
Q. And then, finally, trade secret number 6, this refers to development history. Can you explain what that is?
A. Yes. It goes beyond really what's encompassed by a single revision just to show the chronology of what we were learning, that really encompasses everything that was happening in these animal studies, the changes that we were making, the reasons that we shifted from one revision to the next to the next over the course of these 10 months.
Q. Now, I noticed there was nothing referring to the detailed design of Rev. A or Rev. B, your first mitral valve prototypes. Is there a reason for that?
A. Rev. A and Rev. B were not revisions that we were working on during the course of the relationship with Neovasc, so not something that we included here as a disclosed trade secret.
Q. And this list, this Exhibit 1157 list, this is something that was written up after the lawsuit got filed; is that right?
A. It was.
Q. And how come that's when it was drafted up?
A. Because we were not in the habit of cataloging all of our trade secrets. Everything that we were creating was really a trade secret. So we didn't go through this effort. We had lots of other things that we were focused on, but listing out all of our trade secrets was not something that we needed to do until this lawsuit came up.

Q. And all of those attachments that you referred to, when were all of those generated?
A. All the attachments were all generated during the course of that relationship with Neovasc.
Q. I want to ask you about the relative value of these six different trade secrets. Have you given any thought to which ones are more valuable than others or are they the same?
A. We have. I have.
Q. What did you come up with?
A. Well, I think it's all highly valuable. If we had to break it down, I would say, you know, obviously what happened at the end, where we arrived at, you know, was of a certain value, so the Revision E trade secret number 3, trade secret number 4, trade secret number 6, you know, kind of where we ended up in that progression, probably each of those were of equal value. Trade secret number 4 represents the features that are in E, and then 6 is the whole chronology that arrives at Revision E, which is sort of the best of. And then, separately, I think trade secrets 1 and 2, Revisions C and D, the two of those together are probably worth the same as each of those others 3, 4, and 6 separately, you know, C plus D was the equation that led to E.
Q. You didn't mention trade secret 5 about the mandrel. Is there a reason for that?
A. Yeah, we're not assigning any particular value to the

mandrel at this point.
Q. Thank you.
MR. SGANGA: Your Honor, I'm about to move on to another subject here. Do you want me to keep going or are we --
THE COURT: How long is your next subject?
MR. SGANGA: It will be -- I've got another, you know, 45 to an hour to go here.
THE COURT: Let's get started because just as a matter of logistics, which is apparently why they pay me the big bucks these days, I don't think their food is here yet.
MR. SGANGA: Very good.
THE COURT: This job requires many skill sets.
(Laughter).
BY MR. SGANGA:
Q. Mr. Ratz, you mentioned you were named as an inventor on some patents. So were those patents that CardiAQ filed itself?
A. Yes.
Q. And were these relating to the CardiAQ TMVI prototype frame designs as well?
A. Yes. I'm listed on one patent from an earlier device experience at Accellent, but everything else is CardiAQ filed.
Q. Were you the ones that were working -- were you the one that was working with the attorneys actually to prepare the CardiAQ patent applications?

A. Yes, typically.
Q. And what understanding did you have when you were filing those patent applications as far as when, if ever, the content of the patent applications would become public information?
A. We knew that whatever we put in a patent application would ultimately become public typically 18 months or so after it was actually filed.
Q. But during that 18-month period, what was your understanding as to whether the public could get access to the pending patent application?
A. It was not accessible until it was made public, until it eventually got published.
Q. Did you have any kind of practice in terms of how soon after coming up with some new designs you would go ahead and file a patent application?
A. No, it always took several months. We would wait until we had a critical mass. It's expensive to submit patent applications and prosecute those and move them forward, so you don't do it for every little idea that comes up. You wait until you have a pool of ideas that make sense to combine together and submit. It takes a long time to actually write these hundred-page documents and work with the attorneys to put that together. So there's always a lag between when the invention occurs and when it actually gets submitted into an application just to make sure it's comprehensive and so forth.

Q. Okay.

Let's turn to Exhibit 260.

Is this a published patent application that was filed by CardiAQ?

A. Yes, it is.

Q. And are you and Dr. Quadri listed as the inventors?

A. Yes, we are.

Q. And the filing date, if you look at line number 22, what -- what's the date there for the filing?

A. September 29, 2009.

Q. And then there's also another filing date at line 60 below it that refers to a provisional application. Can you explain what that means?

A. Yes. That's -- the provisional application is the original submission that was filed on September 29, 2008, and then you've got a year from that date to prepare the formal application that gets submitted to the Patent Office.

Q. When you prepare the formal application, can you add more material?

A. You can.

Q. Okay.

And do you know if that's what you did here with Exhibit 260?

A. We did in this case.

Q. And when did Exhibit 260 become published?

A. It became published on April 1, 2010.
Q. Now, there are -- if we turn to the next page, there's drawings of various patterns here, and there's a total of over -- there's a total of 23 different figures or drawings in this patent, right?
A. Yes.
Q. So can you say generally what revisions of the CardiAQ device those drawings relate to?
A. Sure. So it starts with the origami valve design, just the tissue valve concept itself. It shows the Rev. 4 embodiment of the aortic valve concept from way back prior, and then also includes the Rev. C embodiment that we had at that point just prior to that August animal study.
Q. So -- now which one is the Rev. C before the animal study? Is that Fig. 12?
A. It's essentially what you see in Fig. 12. Initially that was sort of the one that embodies what Neovasc had first made in early August, and then if you flip to Fig. 15, that one shows the fully-covered skirt or fully-covered anchors that we shifted to just prior to going into those August animals.
Q. But the one on Fig. 12, did you ever actually use an assembled prototype like this in an animal study?
A. No, we never did.
Q. So the Rev. C -- when was it that Neovasc first was getting information from you about the design of Rev. C?

A. The design of Rev. C started in June of 2009.
Q. And you said this particular patent published in April of 2010.
A. Correct.
Q. So can you do the math there in terms of how much -- how many months there are?
A. About 10 months.
Q. Okay.
And if we go to -- again, back to Fig. 12, I just want to be clear, so this -- was this design ever put in an animal?
A. No. This design was not put in an animal. We had concerns about it before we got to that point and had requested the further modifications before it went to an animal.
Q. Does this design at Fig. 12 reflect the changes that you made that led to this aha moment we've heard about?
A. No.
Q. Let's go to Fig. 14. Can you tell us what we're seeing here?
A. We're just seeing a version of the device shown inside the heart inside the mitral annulus, again, still considering that pinching concept where we were pushing the leaflet aside and you see the leaflet illustration hanging below there.
Q. Okay.
So where's the bottom of the leaflet there? Can you point to that?

A. The bottom of the leaflet is here with the chords extending off of that.
Q. And so based on the position of the leaflet that you just pointed out there, what does that tell you as far as how the leaflet's interacting with the device and the anchoring of the device?
A. That we're still pushing the leaflet aside intra-annularly and trying to create that pinching ledge that we thought about originally.
Q. Again, when was that relative to the aha moment?
A. Before the aha moment.
Q. So is there --
THE COURT: Whenever is a good time for you, Mr. Sganga.
MR. SGANGA: Just a couple of questions.
THE COURT: Take your time.
BY MR. SGANGA:
Q. So does this patent ever disclose the idea of going behind the chords and the leaflets and engaging the annulus?
A. No, it does not.
Q. How does the level of detail about the Rev. C design contained in this patent compare to the level of detail and information that you actually shared with Randy Lane?
A. What gets published in a patent and what's published in this patent is just a fraction of the information. It's a

couple of images. You know, it's not anywhere near the richness of information that we had been sharing confidentially with Neovasc throughout all the engineering drawings, all the discussions, all of the e-mails.

Q. When you filed the patent application --

A. Sorry.

Q. When you file the patent application, does it include those engineering CAD computer files?

A. No.

Q. Does it include the physical prototype? Does that get sent to the Patent Office?

A. No.

MR. SGANGA: Your Honor, this would be a good time to wrap up.

THE COURT: All right, everyone. We're going to recess for lunch. I'm happy to give you 45 minutes, but if you'd prefer half an hour and get back to it, that's fine, too. Why don't you tell Karen on your way out what you'd like to do for lunch.

THE CLERK: All rise for the jury.

(Jury left the courtroom.)

THE COURT: What did they say about lunch?

THE CLERK: I just said I'd come up in a couple of minutes if they want to talk it over.

THE COURT: I'm having trouble -- he got a list of

exhibits, was that for today?

MR. BASKIN: That was not for today, that was for the future but we've agreed to pre-admit them.

THE COURT: The exhibits that are being referred to today, a lot of them have not been admitted; am I right?

MR. SGANGA: Yes. The plan, on my end anyway, was at the end of the day to read in that list.

THE COURT: Okay. All right.

MR. SGANGA: And if it's more convenient, we can also provide a typewritten list as well to the Court and the court reporter.

THE COURT: We're doing fine on the list. I thought what you gave me was for today, and I can see there's a bunch of exhibits that, by my records at least, have not been moved in. I'm fine doing it after the witness as long as the witness is still around. I think I told you this yesterday. I'm leery of excusing the witness and then having a dispute about exhibits. With Mr. Ratz it's not a problem.

MR. SGANGA: I don't think we have any disputed exhibits that we've been dealing with Mr. Ratz so far.

THE COURT: I'm just -- I'm anticipating that there will be things to which you think you have agreement and as it plays out you don't.

MR. SGANGA: I think that is a very insightful, your Honor. We will try to keep the witnesses around until we

resolve it.

THE COURT: Do you want to go up and see what they want to do?

I don't want to take your time, too, if you want to recess for lunch, just leave a couple of people here, and I'll let you know what time we're going to come back on.

I'm sorry, one more thing.

The same as yesterday: If you want to eat with them that's fine. If you want to eat by yourself, I totally understand that too. But if you are eating with them -- I guess he's still on direct. Okay. All right. Sorry, I was thinking we would be on cross before lunch. I take that back. You can still eat alone if you want.

(Discussion off the record.)

THE CLERK: They want 45 today.

THE COURT: They want 45, so we'll be back at quarter of 1:00.

(A Recess was taken, 12:05 p.m.)

(Resumed, 12:47 p.m.)

THE COURT: All right. Mr. Ratz, you're still under oath. Go ahead, Mr. Sganga.

MR. SGANGA: Thank you, Your Honor.

BY MR. SGANGA:

Q. Mr. Ratz, I'd like to point you to another patent application that was filed by CardiAQ. It's Exhibit 77. Is

this a patent on which you are named as one of the co-inventors?
A. Yes, it is.
Q. And can you tell from looking at the figures of the patent what revisions of your TMVI prototypes these figures correspond to?
A. Yes. Primarily Revision E.
Q. And when did this patent application publish? Can you tell from looking at the first page what the publication date is?
A. The publication date was December 22, 2011.
Q. And can you tell when this patent application was first filed?
A. It was filed June 21 -- sorry. Filed June 21, 2011. The provisional on June 21, 2010.
Q. So the June 2010 date, that's the earliest filing of the patent application?
A. That's correct.
Q. And let's compare that to when you first came up with the Rev. E prototype design. When was that?
A. That was starting in December of 2009.
Q. So this patent application filing relating to Rev. E lagged behind the actual design work that you were doing by about six months?
A. For the initial filing, yes.

Q. So why was it filed six months later?
A. Again, because we were waiting, we were taking time to compile information. We wanted to make sure that we had everything that was relevant before we put it in and everything that we wanted to include as an invention in this application, and then the time it takes to prepare it, and there's a lot of other things that we're doing during the course of this with the animal studies and everything else, so we're not filing immediately.
Q. And when did you begin sharing the Rev. E designs with Neovasc?
A. The initial concept for it, again, was in December. This is the concept for the bell-shaped valve that you see in figure 3A and 3B. And so we started sharing it in December and then more followed after that.
Q. So that's December of 2009?
A. Of 2009.
Q. And the patent that we're looking at, the patent application publishes in December of 2011?
A. Two years later.
Q. Right. So Neovasc had access to the Rev. E designs almost two years before this patent application published?
A. That's correct.
Q. And how does the information contained in the Exhibit 77 published patent application compare to the information that

you shared with Neovasc about Rev. E?
A. Again, as with the previous one, it's just a fraction of the information that we shared with Neavasc. It's several images and some description, but it's not anywhere near the level of engineering detail, the physical prototypes, everything else that can be derived from those communications.
Q. Are there any test results described in this patent application that published?
A. No.
Q. Does it explain which of the designs were actually tested?
A. No.
Q. Does it give specific dimensions or sizes about the Rev. E prototype design?
A. No.
Q. Now, are there -- again, any prototypes, any physical prototypes that get submitted with this patent application?
A. No.
Q. Are there more than one proposed design for the review -- for the device described in Exhibit 77?
A. Yes. Sure. We try to cover multiple embodiments when we put a patent application in. So there's a number of variations that could exist within a given design family.
Q. So let's turn to page 15 of Exhibit 77 and to the paragraph number 47 in the upper right-hand column here.
A. Yes. The anchors labeled as 22 and 24 in the diagram can

be one of many different lengths. For example, the anchors can be shorter than, as long as, or longer than any of the upstream transition and downstream portions.

Q. Does it say in the patent which of these particular lengths of the anchors you chose to build in a prototype?

A. No.

Q. Does it say which of the length of anchors you chose to test in an animal?

A. No.

Q. Does it say which of these is in your mind the best way to go about designing the prototype?

A. No.

Q. Let's go to paragraph 48, just below this. What is this describing?

A. The shape of the anchor tips. So we say, for example, the shape can be configured to increase the amount of surface area of the tip that is in contact with the tissue. The tips labeled at 2628 are shown as round or elliptical discs but can have other shapes as well, such as teardrop, rectangular, rectangular with a curved end, et cetera.

Q. Did you ever explain in this patent application that published which of these shapes you picked to make the prototype?

A. No.

Q. Does it say which of these shapes you picked to run an

animal test with?
A. No.
Q. Does it say which of these shapes got the best results as far as you were concerned?
A. No.
Q. Is there anything in this Exhibit 77 published patent application that explains the history of the prior prototype designs that you had come up with before the ones referred to -- described in this particular patent?
A. No.
Q. Let's turn to Exhibit 2173. Is this another patent that you filed in connection with your TMVI designs while you were with CardiAQ?
A. Yes, it is.
Q. And you and Dr. Quadri are listed as co-inventors here, correct?
A. That's correct.
Q. Can you tell from the first page what the first filing date was of the patent application?
A. The first filing date is September 23, 2010.
Q. Now, how much earlier was that compared to when you learned about Neovasc's patent application?
A. We didn't learn about their patent application until December 2011. So over a year before that.
Q. Okay. So -- just to be clear on the screen here, line 60,

is this where --
A. That's the first filing, yes. 2010. Not 2011.
Q. Okay. So as of -- just to be clear on that last question, as of September 2010, you hadn't learned of the Neovasc published patent application, right?
A. That's correct. It wasn't until 15 months later.
Q. Okay. Did you have any idea that Neovasc was working on a competing product when you filed this in September 2010?
A. No. We still had no idea.
Q. Now, there's been some discussion about whether this idea of going through the chords and behind the leaflets is something that CardiAQ actually had thought of back in 2010. Is there anything in this patent that describes the anchors going through the chords and behind the leaflets?
A. Yes. This is the patent where we describe that methodology, and it's very clear in its issue.
Q. Page 30, in the right-hand column starting around line 25, is that the description you're referring to?
A. Yes. "Replacement heart valve can be allowed to self-expand, thus urging the downstream anchors between the chordae tendineae in radially outboard of the native mitral valve leaflets. The delivery device and replacement heart valve can then be proximally retracted or moved upstream to engage the downstream anchors with the downstream side of the native mitral valve annulus."

Q. So this language you wrote up in this patent application how long before this lawsuit got filed?
A. About four years.
Q. Yesterday Dr. Quadri was asked about some public presentations about CardiAQ's work. Who at CardiAQ was responsible for supplying information to be used in those presentations?
A. I was, typically.
Q. Can you turn to Exhibit 266, please. Can you tell us what this exhibit is?
A. This is an exhibit of a presentation that Dr. Joseph Bavaria gave.
Q. And when did this presentation take place?
A. I believe it was October of 2010.
Q. And what was the goal of presenting information at conferences at this time?
A. Really just to demonstrate that we had progressed in this field, that we had moved things forward in TMVI. We wanted to make practitioners aware. We wanted to make industry representatives aware. We wanted to make investors aware. So it was multifaceted in what we were trying to do, but really just explain that we had done it, that we were at the forefront.
Q. Now, have you personally attended the conferences where presentations are being made about the CardiAQ device?

A. Some of them I have, yes. Not all.
Q. And typically how long do these presentations last?
A. Typically eight to ten minutes.
Q. So all of the -- so in Exhibit 266 there's total of 25 pages here. Are you saying all of that material, if it's covered, would be covered in less than ten minutes?
A. That's correct.
Q. And let's go to page 14 out of 25 in Exhibit 266. What's shown there?
A. This is an illustration just depicting the concept of transseptal delivery with one of our earlier embodiments of the device showing the pinching action of clamping onto the annulus by displacing their native leaflets.
Q. And does that correspond to one of the Revs that you worked on?
A. Yes. It corresponds to Revision B.
Q. And I think you said earlier that's not one of the revisions you're claiming as a trade secret in this case; is that right?
A. No.
Q. So no, you're not claiming it as a trade secret?
A. We are not claiming it as a trade secret, you're correct.
Q. Let's turn to page 20 of this exhibit. Can you tell us what's shown here?
A. Yes. This is pictures from a necropsy and explant from an

animal study.
Q. And what does this show as far as the anchoring?
A. What it's showing is that we've engaged the annulus. It's giving a picture of the result of the valve in position.
Q. Does this presentation material contain any detailed design information about the particular CardiAQ prototype frame that was used to get these results shown in the pictures?
A. No, it doesn't.
Q. Does it explain even which revision of the prototypes is being used in these animals?
A. No, it does not.
Q. So now let's go again back to when you started talking to Neovasc about your Rev. D and E frames. That was in what time frame?
A. D started in October of 2009. And E in December, January 2009 to January 2010.
Q. So that's a full year before this Exhibit 266 presentation in October of 2010?
A. Yes.
Q. And how does the level of detail of the information that you shared with Neovasc compare to what's in this presentation?
A. Again, this is a picture. This is an image. There's no description provided. There's no detailed engineering prints. It's kind of a taste of what we've done but not the recipe for how we got there.

Q. Why don't you turn to Exhibit 2123, please. Can you identify what this presentation is?
A. This is the presentation I think we saw a bit of yesterday, too, that Dr. Quadri gave at the TCT conference in 2010.
Q. And what month of the year would that be?
A. I believe that was September.
Q. And did you help assemble the materials to put in this September 2010 presentation?
A. Yes.
Q. Can you tell us what's on page 9 of the presentation? I'm sorry. Let's go back and start with page 8.
A. Page 8 is again that same illustration of transseptal delivery showing the Rev. B prototype with the pinching and displacement of the annulus.
Q. So this presentation is in September 2010. How long ago was it that you had ever worked on a Rev. B design?
A. A year and a half.
Q. Going to the next page, page 10 -- no. I'm sorry. Page 9, page 9. So on page 9 of Exhibit 2123, what's illustrated there?
A. This is a picture of a Rev. E prototype. There's an animation on the right side or was an animation just showing the frame compressing and contracting.
Q. So is this also including all of those CAD files that you

were sending to Neovasc?
A. No.
Q. So what you see is what was presented?
A. That's correct. The green one on the right side would have been moving and opening and closing, but that's the extent of it. There's no detailed information here.
Q. Is there anything in this presentation showing those animal pictures that we just looked at with the anchors on the trigone?
A. No, not in this presentation.
Q. Does this presentation say which of these designs, which rev is being used in the animal studies?
A. No.
Q. So you said you started sending the Rev. D and E materials to Neovasc in December 2009?
A. Yes.
Q. Again, that's about ten months before this September 2010 presentation, right?
A. Yes.
Q. And how did the level of detail in the presentation compare to what you had been giving to Neovasc about your prototype designs?
A. Again, it was a few pictures, nothing close to the extent of engineering and detailed information and the chronology of development revision history, all of those things that we

shared with Neovasc.
Q. There was some testimony yesterday about a conference called Euro PCR. Do you remember that?
A. Yes.
Q. And did you attend the Europe PCR conference in 2010?
A. I did.
Q. That was what month, do you recall?
A. That was in May.
Q. And did Dr. Ruiz make a presentation?
A. He did.
Q. And was there some information about CardiAQ?
A. Yes.
Q. What else was in Dr. Ruiz's presentation at that Euro PCR?
A. He was providing an overview of the entire transcatheter mitral valve space. So a number of other companies it was, you know, a comprehensive overview of pretty much everybody that was competing at that time.
Q. And how much of the presentation was devoted to CardiAQ compared to anybody else?
A. One slide. It was his last slide, I believe.
Q. And that showed some of those, again, those animal hearts with the anchors engaging the trigone, right?
A. Yes.
Q. Did it show the particular designs of the CardiAQ prototype frames that were used in those animal studies?

A. No. I think on the -- he had a lot, trying to cram it into one slide. I think on that same slide he had that illustration that showed the progression with the old Rev. B frame drawn on there.

Q. So now what has CardiAQ done since it stopped working with Neovasc as far as developing the TMVI program?

A. We've continued to move it forward, continued to learn and develop in the same way and through multiple ongoing revisions to try to make this, you know, better and better all the time.

Q. And how has the work that you've done with the Rev. C through E prototypes that you shared with Neovasc impacted, if at all, what you're doing currently in designing your products?

A. It's all still valuable. It's all part of the learning process to get from where you start to where you finish, and the journey in between each iteration that we do is something that we're learning. And we fix one problem and we encounter the next problem and figure out what has to change from that to further optimize it. So it's a continuous learning environment really, you know, to understand the pathway to where we've gotten to.

Even as we encounter new challenges, if we look back and say, "How are we going to approach that, here is what we've done before," we know what not to do as we encounter something else. So, you know, now in this new environment with new engineers from a different company that's acquired us, we're

educating them based on what we learned in the past that's different from the development pathway that they had seen. All that learning kind of comes together, so everybody is sort of building off of that.

Q. So you mentioned the acquisition. And who is the company that acquired CardiAQ?

A. Edwards Lifesciences.

Q. And what was the value of that deal?

A. It was 400 million, as we talked about. 350 of that was up front at the closing of the deal. The other 50 million is contingent upon us getting our device approved in Europe some years out from now. So that still remains to be seen.

Q. Does any of that turn on the outcome of this case?

A. No.

Q. And how did you feel when you learned that Edwards was interested in and ultimately prepared to buy CardiAQ and all its technology?

A. I was -- I was hugely excited. This is what, as a entrepreneur and as somebody that's kind of starting the space, this is what you hope for. You want to get your device out to patients. These are, you know, the leading players in the heart valve space. They dominate the field on the surgical side. They dominate the field for transcatheter aortic valves. They had acquired another transcatheter aortic valve company back in 2004 and had, you know, grown that into a

multibillion-dollar business that's treated hundreds of thousands of patients. And so for Dr. Quadri and I, this is sort of what, you know, the best that we could have hoped for, the best company to come in and acquire us to move this technology forward.

Q. And personally, how much money did you make as a result of that acquisition?

A. 10 million.

Q. And can you give us an idea of some of the effort that you put into CardiAQ over the years that you worked for the company prior to that acquisition?

A. Yeah. It was, you know, nine years of my life. You know, my three kids' entire childhood was me in this job, with this job basically as my fourth child, commands a lot of attention and a lot of time and effort. You know, it's hugely rewarding, but it's not easy. I mean, it's a lot of long hours.

And you know, once we moved the company to California, I moved my family out to California. I lived there for a year. We decided we didn't want to be in California. We moved back to Boston. And I started commuting back and forth for the next five years.

Q. Where did you stay in California when you were doing that commuting?

A. I stayed in my office on an air mattress. You know, we wanted to save money still. We were still startup, kind of

bootstrapping. And I also wanted to maximize my time when I was out there so that I could spend time with my family when I was here. So I got a gym membership and showered there in the mornings and blew up my mattress at night.

Q. Let's talk about some of the corporate steps that took place when Edwards Lifesciences acquired CardiAQ. Can you just explain how that worked?

A. Sure. So the CardiAQ Valve Technologies, CardiAQ Valve Technologies entity stayed the same. Edwards created a subsidiary for the merger called Impala. Impala was merged with CardiAQ Valve Technologies. That company's name was changed to Edwards Cardiac, Inc. And then that company was converted to an LLC. So basically, everything stayed, all the assets stayed with CardiAQ, but it ultimately became Edwards CardiAQ, LLC, a subsidiary of Edwards Lifesciences, LLC.

Q. And those assets that you're referring to, do those include the trade secrets and technology?

A. Trade secrets, intellectual property, everything.

Q. Okay. So let's look at some of these documents here quickly. Exhibit 1387. Is this a document that you signed regarding this merger into the Impala entity?

A. Yes.

Q. And Exhibit 1386, is this the name change document to change the name of the company to Edwards Lifesciences CardiAQ, Inc.?

A. Yes, that's correct.
Q. So Mr. Ratz, based on the experience that you've had in the TMVI field, do you consider yourself to be an expert in TMVI devices?
A. I do. I've spent the last seven and a half years of my life focused only on TMVI.
Q. How many other people in the world have ever designed a TMVI device that have been implanted in a human patient?
A. There's only I think five companies, including ours, that have done human implants, so I'd say maybe a dozen people.
Q. How many other people have designed an implant that's been implanted in a patient trans-femorally for TMVI?
A. No one else.
Q. How many of these human patient cases have you attended where a CardiAQ device has been implanted?
A. I've attended every patient that we've done so far. We've done a total of 17 from 2012 until now.
Q. How about animal studies, have you attended those that CardiAQ has conducted?
A. I have, probably about 90 percent of the animals that we've done, at least prior to the acquisition by Edwards.
Q. Have you done anything to stay informed about what competitors are doing in the TMVI field?
A. I did. So with CardiAQ, I was responsible for running all the board meetings. Part of that was preparing all the

materials for the board meeting and providing our investors and the rest of the board with a competitive update. So on a quarterly basis for the last, you know, I guess nine years, I've been keeping track of the competitive space. And once we shifted over to mitral in 2008, that included what was going on in the mitral side as well.

Q. And how about attending conferences and reviewing literature? What have you done in that regard in TMVI?

A. I've continued to attend TCT, Euro PCR each year. That's in the May/September timeframe, so those are particularly the major conferences for our field just to keep track of who is presenting what and where companies are at in terms of technology, pre-clinical progress, how many patients they've done, anything else that's being presented.

MR. SGANGA: Your Honor, we'd like to offer Mr. Ratz as an expert in TMV devices.

MR. FLYNN: Your Honor, we renew our objections as set forth in our *Daubert* motion.

THE COURT: All right. That's fine. Take it from there.

MR. SGANGA: Thank you, Your Honor.

Q. Mr. Ratz, in developing a TMVI device, are there any specific design challenges that stand out to you as particularly important?

A. Obviously, there's a number of design challenges that

we've talked about and I think going through the anatomy before about all the different aspects of the mitral valve anatomy as compared to the aortic valve anatomy. I think first and foremost in that, though, is having a frame design that can meet all those requirements.

Q. So why is anchoring, in particular, a challenge?

A. Well, I think it's -- you know, there's a kind of a prioritization of problems as you approach this or challenges that you have to solve. In particular, you've got to make sure that you can anchor it. You know, none of the other developments really are of any value unless you can get this to stay put in the mitral anatomy. That's really what differentiates this from anything else that's been done before.

So people have done tissue valves for a long, long time, for 30 plus years. People have done catheters that can get to all areas of the heart for any number of years. People have even done transcatheter aortic valves for over 15 years now. So that particular element of it, you know, if you think, you know, tissue, delivery system, the frame that supports it, the tissue and the delivery system have all kind of been done before in some other way. What makes it different or what makes it more challenging or sort of what makes it possible to achieve a solution in TMVI is having a frame that can accommodate the valve that can fit in the delivery system and still function inside the heart in this environment.

Q. So what's the consequence if the TMVI doesn't get properly fixed in place in the heart?
A. If it doesn't fix in place properly, it dislodges, it migrates. It can embolize up into the atrium or down in the into the ventricle. Either one of those scenarios is likely to lead to the death of the patient if you're not right there onsite and convert to surgery immediately to try to get it out.
Q. Have you ever read any published articles where design challenges for TMVI are the subject of the article?
A. Yes.
Q. Can I point you to Exhibit 612, please? Is this an article that was published in June of 2014?
A. Yes, that's correct.
Q. And when did you first see this article?
A. The lead author, Ole De Backer, had sent it to me in a draft form back in February of that year just to take a look at. He was one of the fellows that was working over in Copenhagen.
Q. Why did he send it to you?
A. He wanted to have us grant permission in order to use an image of the cardiac device in the article.
Q. Did you grant him that permission?
A. Yes, we did.
Q. And when you got the draft, what kind of review did you make of the content of the article?

A. I looked over it briefly at that time.
Q. And how about after it published; did you ever review the article after it published?
A. I did. I had seen it after it published and reviewed it again at that time, just skimmed it.
Q. And in connection with this lawsuit did you review the article again?
A. I did.
Q. And was there anything you focused on in particular at that time?
A. At that time we focused primarily on the first table in the document.
Q. Okay. Before we go to the table, I just want to look at the other authors here. Can you tell me if you know these individuals and what they're doing, if anything, in the TMV space?
A. Yes. So as I mentioned, Ole De Backer, the lead author, was a fellow working with Dr. Sondergaard, the last author here, at Copenhagen, Denmark who we had done a lot of animal work with and some of the human implants with.
Nicolo Piazza is an interventional cardiologist who is a member of CardiAQ's scientific advisory board. Shmuel Banai I did not know directly but I know is the medical director of Neovasc. Georg Lutter is the professor and cardiac surgeon in Germany that I mentioned earlier who had developed his own

Lutter valve many years ago.

Francesca Maisano is another cardiac surgeon who was working on a device for a competing company called ValTech as well as some transcatheter mitral valve repair devices. Howard Herrmann is an interventional cardiologist at the University of Pennsylvania who I knew as well and who had worked on the Endovalve device.

Olaf Franzen had worked a lot on the Mitroclip device as a transcatheter mitral valve repair device but was also in Copenhagen working with Dr. Sondergaard when we did our first in-human there.

Q. So these authors are all heart surgeons or cardiologists?

A. That's correct.

Q. And they've worked with either the CardiAQ TMVI device or some other competitive device?

A. Yes.

Q. And where was this article published?

A. This article was published in Circ Interventions.

Q. So let's go to Table 1 here that you mentioned that you looked at. What's contained in Table 1?

A. So this is a table just outlining the challenges for percutaneous or transcatheter TMVR devices. It just lists kind of the high-level challenges. It's similar to one of the documents that we had seen in that TCT presentation by Dr. Quadri where we had listed out a number of the key challenges

in TMVI as well.
Q. So do you agree that Table 1 represents challenges that TMVI designers face?
A. I do. I think it's a pretty comprehensive list of everything that needs to be considered.
Q. Can you just walk through the different topics that are addressed here as far as these design challenges?
A. Sure. So the first says "Valve Position." "To be deployed in the left atrial ventricular position making a truly percutaneous transfemoral delivery a challenge - because of the requirement for transseptal or transaortic retrograde access to the left atrium or left ventricle and the need for multidimensional, highly-curved catheter course, which is challenging with a large delivery system and limits the precision with which tension and traction are transmitted to the operating end of the system."
Then they note that other possible access routes are transapical, transseptal or transatrial, through the left atrium. But generally the challenge is getting it there. You've got a heart in the middle of the body, and you're trying to get to this chamber in the upper right side here, the left atrium and into the mitral valve, and it's not very easily accessible. So you've got to kind of get through a tortuous path to even get into position to start with.
Q. So have you considered how, if at all, that challenge

relates to the kind of designs that you came up with for the prototype TMVI frames that you shared with Neovasc?
A. I have, and I think that still comes back to the frame. You need to have a frame that can work in position at a fully expanded diameter. But in order to get it there through a less-invasive approach or a transfemoral approach, it's got to be able to get down to size. So you've got to make sure that you can squeeze that down, that it doesn't break when you squeeze it down, that when you release it again, it comes back to full size. As you squeeze it down, you've got to be mindful of the length of that device because now you have to thread it through a very tortuous path, especially if you're coming from the femoral vein. So all of that, even just getting it there, has a lot of implications for the frame in and of itself.
Q. Okay. Why don't you tell us about the next entry in Table 1. What design challenge does that relate to?
A. The next one talks about the unique valve anatomy so that it should fit an asymmetric saddle-shaped annulus. It highlights the fact that we've talked about already that there's no stable calcified structure for anchoring, unlike transcatheter aortic valves in most cases, also that it's a complex structure. It has the subvalvular apparatus composed of the leaflets and annulus and chordae and papillary muscles and even indicates here that preservation of that subvalvular apparatus is mandatory to preserve good LV function and

geometry and that there's irregular geometry of the mitral valve leaflets. So even the leaflets themselves are scalloped-shaped. It's not really as it's depicted here. You sort of have this leaflet the same length of free edge all the way across. It's really a series of scallops that varies throughout. So in some places the leaflets are longer and the chords are shorter, and in other places, the chords are longer and the leaflets shorter. It's very heterogenous.

Q. How, if at all, do the frame designs relate to solving this challenge regarding valve anatomy in this article?

A. Again, it all comes down to sort of how you accommodate the anatomy. So you've got to put this into an asymmetric shape. You've got to make sure that your valve can either conform to that shape or the shape will conform to your valve or some combination of the two.

Like we talked about before, there's no calcification so you can't just push out and hope that it's going to stay there. You've got to grab on to something in order to prevent it from migrating, so that all comes down to the frames, who really has nothing to do with the delivery system or tissue. You've got to make sure that you're not disturbing the surrounding tissue, that you're not disturbing the subvalvular apparatus. So that comes back to the frame in terms of how you engage with that or don't engage with that to make sure that it's not affected. So again, all these relate back to the frame.

Q. Okay. Let's go to the next design challenge listed in the De Backer article. "Dynamic Environment." Can you tell us what that relates to?
A. Yes. This is referring to, in the first case, the fact that the annulus is actually moving through the cardiac cycle. So as the heart beats, this annulus is kind of changing in diameter, shifting throughout the cycle in terms of its area and its circumference. Then also the second one just highlighting the fact that it's going to see those very high pressures, that systolic pressure is the pressure differential across the valve. So you've got to be able to resist that kind of migration force once you're in place. And again, that comes back to the anchoring and the frame.
Q. How about the next design challenge, "Device Requirements"?
A. Yes. This is kind of a combination of things, but you know, first directly describes the frame aspects, saying that it should have a balanced radial stiffness to resist the dynamic environment, avoid the frame fracture, like I was talking about before with that sort of paperclip-type example. You don't want that kind of motion in your frame, so you need to be able to resist that through that stiffness of the diameter. But at the same time you've got to make sure that that stiffness doesn't damage the surrounding tissue. So there's some balance between the two that has to occur where

the heart's not working the frame and the frame is not overworking the heart and you reach that kind of balance between the two. The valve material themselves have to be durable enough to withstand the loads generated. That is true for the tissue and for the metal in the frame.

"The device should not obstruct the left ventricular outflow tract, occlude the circumflex coronary artery." We don't see that it here, but there's an artery that runs around here, so you don't want to kind of pin that and obstruct blood flow to the heart, obviously; doesn't compress the coronary sinus, which is feeding the used blood back to the heart; or doesn't cause any major conduction system abnormality that you'd cause an irregular heartbeat or something like that by pushing on an electrical portion of the heart.

Q. So the prototype designs you shared with Neovasc, to what extent, if any, did they address these device requirement challenges?

A. I think the frame that we showed, especially by the time we had gotten to the development cycle of Rev. E, addressed almost all of these challenges. Again, you know, it had not been tested in a clinical environment at that point in humans, but it was able to be positioned transseptally. We proved that in an animal. It was able to accommodate the shape of the heart, withstand those dynamic forces in the pig, porcine study environment that we conducted, which was similar. It was able

to have enough radial stiffness. So all of these things were really being accommodated.

I don't think that we can say with certainty that we had checked every box here by that point, but I think conservatively we can say at least 50 percent of these and probably more were covered by that frame that we presented.

Q. So now, when you say "covered by," how does that relate to solving the challenges that are described in the article?

A. I think it was capable of addressing these challenges.

Q. And did you believe that the Rev. E design addressed those challenges successfully?

A. I do. From what we had learned, I think it had.

Q. Okay. Let's talk about the remaining challenges listed there. "Hemodynamic Performance" is the next heading. What does that relate to?

A. That's related to regulation of the blood flow. So paravalvular leak just means leak from outside the frame, not between the leaflets but going around the frame and between the frame and the annulus. Again, that comes back to the frame as well.

And then, "The TMVR should restore unidirectional flow while minimizing the risks associated with the procedure." Of course that's referring to the whole implant, but restoring unidirectional flow is really primarily focused on the fact that these tissue valve leaflets have to work. They have to

open when they need to and close when they need to. And certainly there's an aspect of that that you could say is related to the frame to minimize the risk of the procedure. But that one is probably the only one that's really largely related to the tissue valve.

Q. Okay. How about the last category here in the list of challenges.

A. Kind of miscellaneous here, but "Thrombogenicity of a bulky device implanted in a left AV position," or atrial ventricular position, it just means you don't want this thing to be too big. It's all sterile. It's all biocompatible materials, but still it can have a blood response to it. So the smaller you make it, the better. So that's just a general kind of design mantra throughout is that you don't make this bigger than it has to be.

Q. So overall, looking at all these design challenges that are in the De Backer article, do you have an opinion as to what percentage of the TMVI design challenges were solved by the technology and designs of the TMVI frames that you provided to Neovasc?

MR. FLYNN: Your Honor, we renew our objections based on the *Daubert* motion. We believe the question lacks foundation and calls for speculation.

THE COURT: I'm going to allow that question.

A. Again, I would say that we addressed the majority of these

with the Rev. E design, but I would say, conservatively, at least 50 percent.

Q. Thank you, Mr. Ratz.

So let's go back to the timeline of your development work. When did CardiAQ begin working on its TMVI program?

A. In August of 2008.

Q. And when did you first show your Rev. E device to Neovasc?

A. We showed our Rev. E device, the initial concepts for it, in December 2009 and then January 2010.

Q. And the first time you did a transfemoral implant of your TMVI device in an animal, when was that?

A. April of 2010.

Q. And had anyone else implanted a TMVI device via catheter in an animal prior to that April 2010 date?

A. Never. That was the first in the world.

Q. So overall from when you started on the TMVI program, August '08 to that April 2010 animal implant milestone, how many months?

A. 20, 21 months.

Q. Do you think you could have moved any faster to get to that important milestone?

A. I don't think so. I think we were moving very fast. I think, you know -- we talked about before, we were trying to run things in parallel with different vendors at the same time. We had a company of two people, so we had the ability to make

decisions very quickly. We didn't have to have meetings about things. Q and I could talk to each other and say, "Here is where we want to go." We could have a phone call and come up with the next concept and make it happen. We're only two people, but we had good vendors that we were working with, you know, best in class vendors that were doing everything that we needed them to do in a timely fashion. So I think we were moving very quickly and we were learning quickly as we went and, as evidenced by changes that we were making on the fly, I think trying to incorporate that learning very quickly.

Q. Now, you mentioned that you started using your own tissue facility in California in 2010. If you had gotten that up and running earlier, would that have enabled you to progress faster in the development?

A. I don't think so. That was more of a plan for the future, kind of having it ready before we really needed it and I guess in some ways being optimistic that we were going to need it. But we were still in a stage where we were learning from one and two prototypes at a time. We didn't need 100 valves to determine what step we had to go to next. We could see one or two. We could use one or two in an animal and move on from that, make changes quickly based on that. So it wasn't an issue of capacity to make lots and lots of valves. It was really just trying to learn quickly to move to the next challenge.

Q. And before you even got to that facility, you had success with animal studies in the fall of '09 with your modified Rev. C design, correct?
A. That's correct.
Q. And we talked about those design challenges listed in the De Backer article. Do you believe that the Rev. C, modified Rev. C and Rev. D prototype designs that you came up with, that those solved the design challenges listed?
A. I think they were -- yeah, on their way to -- I think the combination of C and D were on their way to solving those same design challenges. So, you know, I think, again, that's what kind of led to the Revision E. But that same learning was there. You know, we had already learned between C and D that we needed to make it stiffer. We had done that with D. We knew that we had to get the atrial profile down. We knew that we had to be working with a design that could get down to size and expand back up, that it was capable of sitting in, you know, the mitral anatomy and holding its shape, withstanding those dislodgement forces. So I think we were on track for that.
Q. So that conservative 50 percent number you gave as to how much of the technology you developed and provided to Neovasc, would that apply to the Rev. C and D designs together in terms of solving the problems in the De Backer article, Table 1?
MR. FLYNN: Your Honor, we renew our objections based

on the *Daubert* motion. The question lacks foundation and calls for speculation.

THE COURT: I'm going to sustain that objection.

MR. SGANGA: Your Honor --

THE COURT: You can try rephrasing the question because I can't even -- personally, I didn't actually understand the question, to be perfectly honest about it.

MR. SGANGA: I'll try again.

Q. Okay. So as to comparing the designs in Rev. C and D that you shared with Neovasc to that list of design challenges in Table 1 of the De Backer article, do you have an opinion as to what percentage of those design challenges were solved by the C and D designs?

MR. FLYNN: Same objections, Your Honor.

THE COURT: I'm going to let him have that question.

A. I think by the time that we had gotten to Rev. D we had a device that was capable of meeting at least 50 percent of those challenges.

Q. Thank you.

Now let's talk about how long it takes to develop a TMVI device. Do you have an opinion as to how much longer it would have taken Neovasc to independently develop its Tiara device if CardiAQ had not provided its trade secret?

MR. FLYNN: Your Honor, we renew our objections based on the *Daubert* motion.

THE COURT: Sustained.

Q. Do you have an opinion as to how long it would take to develop the same technology that you had developed and shared with Neovasc if other companies were trying to do the same thing?

MR. FLYNN: Same objections, Your Honor, and vague.

THE COURT: Try rephrasing that one.

Q. If another company didn't have access to your confidential designs for your TMVI prototypes, do you have an opinion as to how long it would take for someone to independently develop that set of designs?

MR. FLYNN: Your Honor, we renew our objections based on the *Daubert* motion. The question lacks foundation and calls for speculation. It also calls for an opinion that wasn't properly disclosed under Rule 26.

THE COURT: Can I see you at sidebar, please.

SIDEBAR:

THE COURT: He said it took him 20 months and he didn't think anyone could do it faster. So is the answer going to be the same, 20 months, or is he going to have some other number?

MR. SGANGA: He's going to say conservatively 18 months.

THE COURT: I'll let him have that.

MR. FLYNN: May I renew the objections at sidebar and

not have to repeat them here.

THE COURT: Sure.

MR. FLYNN: We renew our objections as set forth in the *Daubert* motion. In addition to that, it's beyond the scope of what was disclosed pursuant to Rule 26. It lacks foundation and calls for speculation. It's also based on unfounded testimony by virtue of the witness's own admission in deposition that he had no idea about any facts related to Neovasc's development.

THE COURT: It's not coming in as an expert opinion. It's coming in as his -- based on his experience, that's how long it took.

MR. FLYNN: He can say that's how long it took him, Your Honor, but he's extrapolating -- it's obvious the question is trying to say he's extrapolating into how long it would have taken us but for the accusations, and that goes to the heart of the *Daubert* matter.

THE COURT: He's testified that it took him 20 months and he doesn't think anyone could have done it much faster. It's not an expert opinion.

MR. SGANGA: We just want to note for the record that our objections to the *Daubert* motion were set forth in our opposition and we disagree with the contentions.

MR. FLYNN: Now, I want to make sure I'm on the record for --

THE COURT: Yes, that's fine.
(End sidebar.)
Q. Mr. Ratz, let me repeat here. If another company didn't have access to your confidential designs for your TMVI prototypes, do you have an opinion as to how long it would take for someone to independently develop that set of designs?
MR. FLYNN: Objection, Your Honor. That's a different question, and we would like to renew our objections based on the *Daubert* motion. The opinion wasn't disclosed pursuant to Rule 26. It lacks foundation and calls for speculation.
MR. SGANGA: I'm reading from the transcript the question that was just asked and that we just addressed.
THE COURT: It's fine. I think it might be clear if you asked him based on his experience how long it would take someone else to develop starting from scratch, but I'll let you have it either way.
BY MR. SGANGA:
Q. Okay. Mr. Ratz, based on your experience in the TMVI industry, how long do you believe it would take another company who didn't have access to CardiAQ's confidential designs to develop a TMVI device?
MR. FLYNN: Same objections.
THE COURT: Overruled.
A. I think you've got to look at the space first and foremost and say, without access to those designs, it's possible that

they may not have even ever gotten to the point that they got to with the use of those designs. There's a number of companies in the space competing, you know, bigger than Neovasc, more resources than Neovasc, more experience in the heart valve space, that never got to a successful design and folded up before that.

But I would have to say based on my experience that it would take them at least as long as it took us. Again, I think we were moving very quickly. I think we were learning from everything that we were doing. We were not lacking in terms of resources to move things forward or to move things forward quickly, and so I would say again over that, you know, same 20-, 21-month period, you know, at least 18 months to get from scratch to where we had gotten to during that period.

Q. Now, during that 18 months that you were working on your designs, you developed different revisions and came up with different designs. Does that mean you wasted time in the development process?

A. No. I think we did everything that we could to maximize the time that we had and the resources that we had. Again, we were doing things in parallel. We were trying to, you know, move it fast and move it, you know, with a sense of urgency. And like I talked about, with two people and a team of vendors, you can do that very quickly without, you know, getting bogged down by other meetings or other decisions or anything else. It

wasn't a matter of having to throw more resources at this in order to get things done faster.
Q. So do you think if you had more money, you would have gotten there any more quickly?
A. No, I don't think so.
Q. And when you started working with Neovasc, did you get any sense that they had any more experience in TMVI design than you did?
A. No.
Q. So how does having a competitor like Neovasc impact CardiAQ? What did you experience?
A. Well, I think in a number of ways, but we're competing for some of the same investment dollars as, you know, a growing company and trying to attract interest in this space. We're competing with, you know, teams of physicians to endorse the product or to serve on advisory boards or, you know, at later dates to serve as investigators for clinical studies, so, you know, trying to attract the right surgeons or cardiologists to your team just during the course of business.
Q. So did you have any experiences where you were competing with Neovasc for those well-known surgeons?
A. We did. You know, if you recall -- and I don't know if we had it up, but in that first e-mail that Brian McPherson sent to me introducing the company, he noted the fact that, by the way, we both have Dr. Marty Leone, who is a renowned

interventional cardiologist out of New York City, on our advisory boards. He was on our advisory board at the time for CardiAQ for our TMVI device and he was on their advisory board for their Reducer device for refractory angina, which is a separate condition, and he later decided to leave our advisory board.

Q. Now, we talked about Neovasc's impact on you, but weren't there other competitors in this TMVI field?

A. There were. There were a number of other competitors in the space, and that was growing, you know, the entire time that we had been in this particular field.

Q. And were you monitoring them as part of your job?

A. I was, again, on a quarterly basis, I was providing those updates to our board of directors.

Q. Can we turn to Exhibit 162, please.

Is this one of those updates that you provided?

A. It is.

Q. And can we turn to page 12 of 13 in the exhibit. Can you tell us what's shown here?

A. This is the first page of competition, you know, the ones at the time I guess we thought were furthest to long compared to us, Neovasc, the Lutter valve that I mentioned that had at that point had become Tendyne medical, ValTech who was the company that Dr. Maisano on that paper was related to, Medtronic, a major player, and then Edwards Lifesciences.

Q. Is there anything about Neovasc amongst this group of competitors that makes them different in your view?
A. They were the only company other than us that was using a single-piece nitinol frame with anchors that went between the chords and behind the leaflets to engage the annulus for their anchoring mechanism.
Q. What were some of the other techniques that these competitors you were following were using to secure the device in place?
A. The Lutter valve was using the tethering system you see in far right side there, over here. The ValTech valve had a two-piece system, so there were anchors coming up in a docking station, and then a valve that got deployed inside of that. So this is going around the docking station here. The other one shown here was the Medtronic device that had two clips to pinch the leaflets. That was similar to what the Edwards program was doing as well --
Q. And what --
A. -- to actually touch the annulus.
Q. What's Medtronic doing now; do you know?
A. Medtronic ended up stopping their internal program and acquiring another company.
Q. Why don't we go to the next page in this presentation. What are some of the other approaches for fixing the device in place in the mitral valve anatomy?

A. This is another list of companies that were much earlier on that just had patent applications, but Highlife was a company that -- there's no image shown here, but they had a suture that went around the chords and kind of formed a belt, and then they radially expanded a frame inside that belt. That was their method for anchoring.

You see this other one here from Jacques Seguin, who was one of the inventors of one of the earliest transcatheter aortic devices. This was an idea to have a metal ring or nitinol ring come out, so like a key ring where half the circle went above the annulus and half went below and it formed a backstop for radial expansion so that you could drop an existing transcatheter aortic valve inside of that. But again, a completely different mechanism. Some of the other ones here, this was a bi-leaflet valve with a frame that kind of popped out under the commissures from Mitrassist.

Q. How about Edwards? They're one of the players here. Did they have a program as well?

A. They did. They had a couple of patents that they had issued as well. One had that same kind of apical tethering, and then another one had paddles that went on either side of the anterior and posterior leaflet just to clip the leaflets to the frame and so it didn't touch the annulus. It was kind of suspended on the leaflets.

Q. Now, you mentioned working with other vendors, and I'm

going to ask about -- we talked a lot about cutting the metal frames. You had vendors do that for you, correct?
A. That's correct.
Q. Was that under non-disclosure agreements?
A. Yes.
Q. And you've worked with other vendors or contract manufacturers in the course of developing your TMVI device?
A. We have.
Q. Have you ever had any disputes with any of those vendors where they've developed a competing device?
A. No other disputes.
Q. During opening statement, did you hear the Neovasc attorneys' statement that Neovasc was wrong when it failed to inform you that it was developing a competing product?
A. I did.
Q. Was that the first time you've ever heard Neovasc say that what it did was wrong?
A. That was the first time, ever.
Q. How did that make you feel, hearing that?
A. It made me feel good that there was actually an admission of guilt, that they recognized that they should have done that. And at the same time, you know, it doesn't make up for the fact that they didn't tell us six years ago when we first -- six and a half years ago when we first started working with them, and, you know, it still doesn't give us the opportunity to go back

and fix it. So I wish they would have just told us at the time that they were starting the program.

MR. SGANGA: Thank you, Mr. Ratz. Your Honor, I have no further questions.

THE COURT: While they're switching places, if anybody wants to stand up and stretch and move around a little bit, that's fine.

MR. FLYNN: Your Honor, are we ready?

THE COURT: Whenever you're ready.

MR. FLYNN: Thank you.

CROSS-EXAMINATION BY MR. FLYNN:

Q. Good afternoon, Mr. Ratz.

A. Good afternoon.

Q. It's nice to see you again.

A. Likewise.

Q. You were deposed twice in this case, correct?

A. That's correct.

Q. On the first occasion, my partner, Charles Graves, took your deposition, correct?

A. That's correct.

Q. And then early this year I took your deposition?

A. That's correct.

Q. On both occasions you understood that the testimony you were providing, although we were in a conference room at your lawyer's office, it had the same solemnity and effect as if you

were testifying here at trial, correct?
A. That's correct.
Q. And you were under oath to tell the truth?
A. Yes.
Q. And you did your best to do that?
A. I did.
Q. If we could, please, I'd like to start sort of where you finished.
MR. FLYNN: May we have Exhibit 612 back on the screen? I think that's the one.
Q. This was the Ole De Backer article, correct?
A. That's correct.
Q. Let's turn to the second page. That's the table. Could we blow up that table?
That's the table you were testifying about, correct?
A. Yes.
Q. And in essence, you were simply repeating, reading in what Dr. De Backer and others had published in this academic piece, correct?
A. I was reading through this document, yes.
Q. You weren't an author of this document, were you?
A. I was not an author of this document.
Q. How many people wrote this document?
A. We can go back and count. I think probably about seven people.

Q. Do you know all their names?
A. I know of each of them, yes.
Q. But we'd need to go back, correct?
A. We can go back. Do you want me to do as many as I can from memory?
Q. No, no, no. I'm not meaning to suggest you ought to remember every name either. I'm merely trying to suggest that this is an academic piece written by a number of medical professionals, none of whom are you, correct?
A. That is true.
Q. At the time I took your deposition, the ground rules were -- well, let's back up, I took your deposition in your capacity as a supposed expert in this field, correct?
A. Correct.
Q. And the rules were that at the time you were testifying you were prepared to testify in court, true?
A. That's correct.
Q. And at that time you had never read that article front to back, had you?
A. I had never read it word for word, no.
Q. Has that changed since that time?
A. I've read through it since then, yes.
Q. After I asked you whether you had read it front to back, word for word, you said no, in the meantime between then and now you've gone back and read it?

A. I have.
Q. But you still were willing to express all the opinions we've heard today at that deposition before you had ever read it, correct?
A. That's true. It describes all the companies that I'm already familiar with and was familiar with before I read this document and all the challenges I had read through in that table, yes.
Q. And the challenges that are set forth in that table, again, because they're put forth in an academic article, written by professionals, not you, they're all part of the public domain, aren't they?
A. Sure.
Q. None of this is a trade secret; the fact that these are issues that need to be solved with respect to a TMVI device, the identification of those issues don't belong to CardiAQ, correct?
A. No, I don't believe they do.
Q. It's part of the public knowledge, free for anyone to use, correct?
A. That's true.
Q. Did I hear you correctly that you expressed the opinion that your Revision E -- I think the verb you used was solved -- that your Revision E solved half of these challenges?
A. I believe that it would have, yes.

Q. Well, would have or did?
A. I think it addressed these challenges as described.
Q. Well, it's a big difference to address a challenge than to solve a challenge, agreed? Yes?
A. Yes.
Q. So what I heard you tell the jury is that Revision E solved these challenges; is that true?
A. I believe I did.
Q. Well -- so I heard you accurately. Are you going to double down on that? Did Revision E solve half of these challenges?
A. I think as we learned about it from the animal studies that we had done, we were able to deliver it transseptally. It was able to fit in an asymmetric saddle shape, and so I think it was proven in the animal studies that it could perform in that capacity.
Q. Let's back up. Revision E was never implanted in a human, correct?
A. It was not implanted in a human.
Q. The implant you described yesterday from 2012, the first in-human --
A. Yes.
Q. -- what revision was that?
A. Revision J.
Q. And it works the way the alphabet works, correct?

A. Correct.
Q. F, G, H, I, J?
A. That's correct.
Q. Now, Revision E was implanted in an animal transfemorally, correct?
A. That's correct.
Q. But that animal didn't survive, did it?
A. That animal was not intended to survive. It was an acute study, temporary.
Q. Now, for the benefit of the jury, an acute study is a study in which the animal is not expected to survive for very long at all, correct?
A. That's correct.
Q. And a chronic study is a study in which the animal is expected to survive a certain duration of time, correct?
A. That's correct.
Q. True?
A. That's true.
Q. Now, Revision E was never implanted in any animal that survived long enough to qualify for a chronic study, correct?
A. That's correct.
Q. And even Revision J, the device you implanted in a human --
A. Mm-hmm.
Q. -- that happened in 2012, correct?

A. That's correct.
Q. That patient died shortly thereafter, correct?
A. Correct.
Q. And we saw an autopsy photograph with what people have described as zebra or tiger stripes, correct?
A. Yes, we have seen that.
Q. And controversy over those stripes caused at least one of your investors to modify their investment decision, correct?
A. That was one parameter. There were a number of things that they cited that they said they wanted to modify in due diligence.
Q. I'll take that on faith. But at least one factor was controversy over the zebra or the tiger stripes on that heart, correct?
A. I think that's true.
Q. And as a result, there were further modifications to your device, correct?
A. That's correct.
Q. And one of those modifications was an attempt to make the device -- I think the words in your documents are "more atraumatic," but it sounds like a double negative to me. In regular English, what you were trying to do was make your device less traumatic to the heart, correct?
A. Yes.
Q. Thank you. And having done that 2012 human implant, you

didn't do another for two more years, correct?
A. That's correct.
Q. Now I'd like to change topics. You've indicated a couple of times in your direct examination -- and it's something I know because we've met before and the jury knows because they've seen you -- you were here for opening statements, correct?
A. Yes, I was.
Q. And you heard some of the things I said in Neovasc's opening statement, correct?
A. I did.
Q. So you've had a day or two to think about it, right?
A. Yes.
Q. Let's turn, if we could, to Exhibit 1005, which is the NDA. I heard you testify that you read this before you signed it, correct?
A. That's correct.
Q. And you were comfortable with it?
A. Yes.
Q. You felt it was sufficiently protective to go forward?
A. Yes.
Q. What I heard, I thought for the first time, was that you specifically read paragraph 4; is that right?
A. I did.
Q. And you were comfortable with paragraph 4?

A. Yes.
Q. Let's blow that up. What paragraph 4 says is that the restrictions on the recipient, in this case Neovasc, disclosure and use of CVT's confidential information, those restrictions don't apply to a number of circumstances, correct?
A. That's correct.
Q. They don't apply to any information that was already known to Neovasc, true?
A. That's true.
Q. They don't apply to any information that CVT disclosed to third parties without restrictions on those third parties' disclosure or use of the information, correct?
A. Correct.
Q. So you understood that to mean that information CVT shared with others not subject to any restriction wasn't protected by this agreement?
A. Correct.
Q. So information you put on the Internet was fair game, correct?
A. That's correct.
Q. Information disclosed in conferences and public forums was fair game, correct?
A. Correct.
Q. Information publicly known, information available in the academic literature and elsewhere, that was fair game, correct?

A. Correct.
Q. And the last is information Neovasc independently develops without resort to CVT's information. That was fair game, too, correct?
A. Yes.
Q. So the sum and substance of all of that, before you shared a single piece of information, you'd considered that Neovasc was free to independently develop a device, a TMVI device, provided it didn't use your information, it relied solely on things it independently developed, things that were publicly available, things it already knew and things CVT disclosed in public, correct?
A. That's correct.
Q. None of that is wrong, correct?
A. That's correct.
Q. Now, you also know, you've read this agreement more than once since a controversy arose between the parties, correct?
A. Sure.
Q. You know there's nothing in the text of that agreement where CVT -- or I'm sorry -- where Neovasc promises not to compete with CardiAQ, correct?
A. That's true.
Q. And there's nothing in this agreement where Neovasc says it's going to let CardiAQ know if it makes use of paragraph 4 in any of these various ways, correct?

A. Nothing in this agreement.
Q. Absolutely. We just heard it. You've heard me say we're not here to defend the idea that you weren't told. But let's move past that. Let's focus on what this agreement actually says and how it operates.
I'd like to put on the board what you said yesterday. If we could blow that up so it's a little more legible, the bottom part, please, Bill. Last question and answer.
Now, this pertains to paragraph 4 where you indicated that you had read it, you considered it, you were comfortable with it. It was the basis -- one of the bases upon which you moved forward. And you were asked by Mr. Sganga, "How important did you consider that" -- that being paragraph 4 -- "in deciding whether you were comfortable sharing CardiAQ's prototypes with Neovasc?" And your answer was, "It was very important to us, and, like I said, we didn't want to prevent competition. We just wanted to make sure that our information wasn't misused or used for anybody else's benefit."
Now, that testimony, you were responding to some of the things that I said on behalf of Neovasc in the opening statement, correct?
A. I was responding to the question.
Q. Fair enough. In responding to the question, were you trying to address -- you heard me say that CVT fundamentally just doesn't want to compete with Neovasc. Do you recall that?

A. I do recall that.
Q. And this was at least in part a response to that, correct?
A. Well, I think -- just in general I think we don't want to prevent competition. We certainly never expected that Neovasc would become a competitor. This document, the NDA doesn't prevent them from competing with us. And if you look at our track record and how we operate in the space, we weren't trying to prevent any competition in TMVI. What we wanted from this document was just to protect our confidential information.
Q. Mr. Ratz, in your deposition you testified that you felt that the NDA that you had in place protected you from Neovasc ever competing with you, correct?
That's the position you took when you were first deposed?
A. Yes, if you say so.
Q. Well, I do say so. If you deny it, I can prove otherwise. If you agree, we can go forward.
A. I agree. I don't recall everything from the deposition, but I agree.
Q. Okay. And that's different from what you said yesterday, isn't it?
A. Yes.
Q. Fundamentally different, true?
A. Yes. Like I said, I didn't expect them to compete with us.
Q. That's not my question. In your deposition you testified

under oath that you felt the NDA that you had in place protected you from Neovasc ever competing with you?
A. I think that's true. The fact that we were sharing information with them and they weren't going to use it for our benefit, I didn't expect that that would allow for competition.
Q. Let's take these one at a time. And politely, Mr. Ratz, I'd like you to focus on what I ask you and to simply answer the factual question I ask you. You'll get a chance. If you have more to say, your lawyers will get to ask you questions when I'm done.
A. Understood.
Q. In your deposition you testified that you felt that the NDA you had in place protected you from Neovasc ever competing with you, correct?
A. That's true.
Q. And in fact, in your deposition, you denied that as long as Neovasc didn't use your confidential information, they were perfectly free to compete with you, didn't you?
A. I don't recall.
MR. FLYNN: Your Honor, may we play pages 40, line 8 through 40, line 15 from Mr. Ratz's 2015 October 8 deposition.
THE COURT: Give me the cites again. You gave me the cites before the volume number.
MR. FLYNN: I'm sorry. It's the 2015 deposition, and the cite is page 40, line 8 through line 15.

THE COURT: Are you using the deposition pages or the page number pages?

MR. FLYNN: Deposition page number pages.

THE COURT: Any objection?

MR. SGANGA: I don't think it's impeachment, but we don't have any objection to the testimony.

THE COURT: It's refreshing his recollection at least.

MR. SGANGA: Okay.

(Video played.)

Q. So again, you said yesterday in response to my opening that you weren't trying to stop competition here, but you testified in October of last year that Neovasc wasn't free to develop a device even if it used -- didn't use your confidential information, correct?

A. I think responding to what was just shown here, I think what I'm trying to articulate is that competing as a contract manufacturer was not something that I ever would have expected. It was never my experience in all the years that I've been in this industry that a contract manufacturer would become a competitor.

Q. Mr. Ratz, in your deposition you denied that Neovasc had the right to use publicly available information to develop a device, didn't you?

A. I don't recall that.

MR. FLYNN: Your Honor, may we play page 44, line 22

through 45, line 3?

THE COURT: Yes. Any objection?

MR. SGANGA: I think for completeness, Your Honor, we should go to 46, line 5.

MR. FLYNN: Your Honor, there's no completeness objection to impeachment.

MR. SGANGA: Federal Rule of Evidence 106 provides that.

THE COURT: I'm not sure about that. But he wants to play six lines and you want to play an additional page?

MR. SGANGA: I will withdraw the objection, Your Honor.

THE COURT: Yeah. I think that's right. Go ahead.

(Video played.)

Q. Mr. Ratz, in October of 2015, you testified that you viewed the NDA as an inherent promise that Neovasc wasn't going to compete with you, correct?

A. I may have.

Q. And that's different than what you told us yesterday, that you weren't trying to stop competition at all, correct?

A. Yes, it sounds slightly different, I think. Again, going back to what we're seeing in the testimony, my expectation was never different. I never expected them to become a competitor, but I agree that the NDA does not prevent them from becoming a competitor.

Q. And that sounds like a big difference to me, respectfully. In October of last year, you testified that the NDA was a blanket inherent promise that no one from Neovasc would ever compete with you. You testified yesterday under oath that you weren't trying to stop competition. You testified already today that you understand paragraph 4 permitted Neovasc to do all the things permitted under paragraph 4. All of that is fundamentally inconsistent with the idea that the NDA is an inherent promise not to complete, isn't it?
A. I viewed it from a standpoint of good faith business dealings.
Q. Well, how did you view it yesterday when you said you weren't trying to stop competition?
A. I don't think we were trying to stop competition.
Q. So today you do understand, don't you, that none of the protections afforded CVT's information under the NDA even apply to publicly available information, correct?
A. I agree with that.
Q. Right. And you understand today that none of the protections afforded by the NDA for CVT's information even apply to information Neovasc already knew, correct?
A. I agree with that.
Q. And you understand today that none of the protections afforded by the NDA for CVT's information applied to information CVT disclosed in public, correct?

A. That's correct.
Q. And you understand that none of the protections afforded by the NDA apply to information Neovasc developed independently without resort to CVT's confidential information, correct?
A. Correct.
THE COURT: Is this a good place to stop?
MR. FLYNN: It is, Your Honor.
THE COURT: So why don't we let them have an afternoon break and we can come back.
(Jury exits.)
THE COURT: I want to give you each a chance to have a break, but I'd also like to take up this Randy Lane thing. I have a conference in another case right at 4:00, so I can either do it now or it can wait until tomorrow morning. But we're starting at 9:00 tomorrow. I'm afraid we're going to be squeezed tomorrow. Do you want to take ten minutes to at least start the discussion about this?
MR. GRAVES: I'm ready, Your Honor.
THE COURT: Do you need a break, Mr. Flynn?
MR. FLYNN: All I need to do is quickly get to the men's room, Your Honor.
THE COURT: Do you mind if we start this? Is he handling it?
MR. FLYNN: Mr. Graves can handle it.
THE COURT: That's fine.

MR. SGANGA: Your Honor, our preference would be to address it tomorrow afternoon.

THE COURT: Can't do it tomorrow afternoon. Tomorrow is Friday. We're sitting from 9:00 to 1:00. And I have to -- it's my uncle's 100th birthday party, so I have to get out of here. Just to give you the rest of my complicated life, my husband is traveling, and I can't leave the house until our childcare provider arrives, so we're tight tomorrow. I'll probably be here by 8:30, quarter of 9:00, unless there's a traffic accident on the Pike. When does this need to be resolved?

MR. SGANGA: We can do it now then.

THE COURT: I have a hearing at 4:00 today. Let's at least get started on it.

So I'm disturbed about this whole issue, to tell you the truth. So Neovasc opened with the idea that Randy Lane's knowledge of JenaValve predated his relationship with CardiAQ and he was an inventor on an patented heart valve. And CardiAQ's interrogatories go to what happened after 29, so that all seems relatively straightforward.

There's some reference to the interrogatory 7, but there was no motion to compel on that. There wasn't any sense that CardiAQ was unhappy with Neovasc's response on 7. But we nonetheless dug around a little bit.

I wanted to make sure we got this right. It's

obviously an important issue. It's already in front of the jury in some form of another, which makes it more complicated. We went back to Randy Lane's declaration, which is document 196 on the docket. Have you guys looked back at this to prepare for this?

So there's things in there that just seem blatantly inconsistent with what was sort of in the motion papers and what was on the screen during the opening. First and foremost, if the idea is Randy Lane's knowledge of JenaValve predated CardiAQ, their interrogatory doesn't really get to that.

MS. LEA: Your Honor, if I may, it does. It asks for everything after January 1, 2009. We didn't start working with them until June 2009. So it was intended to predate CardiAQ by at least six months.

THE COURT: It's very little predating. And your motion, all of it, except the commentary in interrogatory 7 is very forward-looking. Your argument was that you wanted to make sure that they weren't using any of your stuff to benefit any of their other customers. That was the gist of it. But then I'm looking at Randy Lane's declaration, which says that nothing with JenaValve happened until after the CardiAQ relationship was over and that it doesn't mention him having any sort of inventorship role in JenaValve. In fact, he just talks about that their device was already complete and was being marketed in Europe, and his only role in this was

basically to shove cotton balls into it. So I don't know. What's the --

MR. GRAVES: Well, there's a quick way through this, Your Honor, which is, what we've done in the opening statement and what we'll do in this case is talk about what's in the public domain. And JenaValve, like many other companies, publishes things in the public domain that human beings like Mr. Lane see. He, like any other witness, is free to come and say what he's seen in the public domain at any given date. That's distinct from whether he does work for them or whether he doesn't.

In addition, I think there's kind of a mistake of fact here issue about the patents. What he's saying or what we're saying is that JenaValve was publicly identifying this product and its features. That has nothing to do with the work that Neovasc did for them. Let's assume JenaValve was never a customer. We'd always be free to come and point at what our --

THE COURT: That's true, but this is a very misleading declaration, which, had that declaration said something else, they might have pursued the information in a different way.

MR. GRAVES: Here is the second point I wanted to make. I think it easily clears it up. JenaValve, like any other customer, hires on a periodic basis. We just heard how CardiAQ did that as well. You pick up projects. You have different orders. There are different projects with JenaValve

over time. And the one with the cotton balls that was the subject of the motion was a different project. And that's the project being spoken about there. That was focused by work by an employee named Krista Neale, and it's a different project in the timeline from different work that's been done with JenaValve.

THE COURT: To say that -- this declaration clearly implies that he had nothing to do with JenaValve until after the relationship with CardiAQ ended, and certainly he acts as if he's a stranger to JenaValve. There's nothing in here about, that he was a named inventor on a JenaValve patent.

MR. GRAVES: That wasn't the issue. That was a different product, and he wasn't called upon to swear to say he was or wasn't --

THE COURT: There's no qualifications like that in this declaration.

MR. GRAVES: But he wasn't called upon to need to do that. That wasn't the issue during that discovery. No one was saying he was or wasn't an inventor.

THE COURT: It's a very misleading declaration.

MR. GRAVES: I don't believe it was. I believe he was speaking about a specific project that wasn't at issue with what we're talking about now. He wasn't called upon, no one argued that he was or wasn't an inventor on a different project. That wasn't the debate that anybody was having. It

wasn't spoken about.

THE COURT: I have to disagree with you. I think this declaration is very troubling.

MR. GRAVES: There are actually two different projects. The first project is a transcatheter valve. It's a different project. The second one was pulling material from a pig. In other words, it's not even the same thing at all.

THE COURT: I take what you're saying, but I'm just saying that to answer this declaration this way, in this opposition to compel, and then to open with that, it's -- I don't know how -- I mean, your point is in your response that they could have asked about all these things, but I think that they were actively misled in this declaration and that that may have been what caused them not to ask about it.

MR. GRAVES: I think that was focused on a specific project relating to pulling value from a pig. That's not the same thing as working on a medical device. It wasn't even on anybody's radar screen at this point. So he's not speaking one way or the other about that. He's not saying I've never worked with them. He's not saying there wasn't a different project. He's not saying I'm not a named inventor. He's talking about this particular project that Ms. Neale was working on that was the subject of the dispute.

THE COURT: I'll look at this again tonight. We'll continue the conversation tomorrow, but I'm troubled by this.

You may be right. In fact, I'll give it to you that you are right that it's two separate projects, but I think this is really, you know, a disingenuous declaration.

MR. GRAVES: Because it wasn't on anybody's radar screen to be thinking about this other project, I don't think anybody was trying to mislead anyone. It was very focused on this dispute. And if anyone had talked about the publicly available fact that he was inventor on this patent that was public --

THE COURT: Well, the circumstances -- the opening, on the dec in opening, page 6, when was that work done? When is that?

MR. GRAVES: Sorry.

THE COURT: When did he work with JenaValve? When was he the named inventor on the patent?

MR. GRAVES: The first application he was a co-inventor on was filed in May of 2009.

MS. LEA: Your Honor, can we have the application number? Because we do not see that.

MR. GRAVES: I don't have it memorized.

THE COURT: Can you get it to them tonight?

MR. GRAVES: I sure can.

MS. LEA: We do not believe he was a named inventor until May 2010.

THE COURT: Are you differentiating between the file

date and provisional date?

MS. LEA: Yes. In that case the provisional did not include Randy Lane as an inventor. He was added later, May 2010, which suggests that he had no contribution to the original information.

MR. GRAVES: To be clear here, Your Honor, the point is that he's familiar with what the product does. It's not that he invented all of these features. No one has ever said that.

THE COURT: How long was his involvement with JenaValve?

MR. GRAVES: I believe it's been sporadic and on and off.

THE COURT: Since when?

MR. GRAVES: I believe around the beginning of 2008, but I don't know the exact date, if it was late 2007 rather than early 2008. It might be slightly off.

THE COURT: And what is the patented heart valve? Is that an aortic valve or a mitral valve?

MR. GRAVES: It's a transcatheter replacement aortic valve.

THE COURT: Now, I want to give everyone at least a couple minutes break here, myself included, but the testimony that I've heard on the stand, from the stand is that an aortic valve and a mitral valve are totally different animals.

MR. GRAVES: I think you'll fine that's way too strong a statement. But either way, if somebody knows in the public domain about features already and that's their source of their idea for something, even if a different type of product -- let's imagine a hypothetical like software development. If someone is accused of stealing something in the coding language C plus, it's all the same idea and the coding language -- in the previous project, and they just transpose the idea and that was the true source of the idea, that would be a complete defense to the claim. So the same thing is true here.

THE COURT: Okay. We'll get back to this tomorrow. I'll give everyone their four minutes.

MS. LEA: Can I ask the Court, just one more cite. I do want to point you to our motion to compel, document 95, that you have to look under-seal version to see the part where we pointed out that they're going to make this defense.

THE COURT: Make it about interrogatory 7, right?

MS. LEA: Interrogatory number 1 sought the same information, Your Honor, history with prior customers all the way back to January 1, 2009, which would have included this JenaValve relationship. And we pointed to the interrogatory number 7 to say, "Look, they're going to make this argument. They're going to say that he learned this information from customers." And they responded, "To justify its motion, plaintiff pretends that Neovasc has relied upon work with other

customers in it defenses." It has not.

THE COURT: No. I understand. I've read it all. I read the under-seal version. It's sitting right here on my desk.

MR. GRAVES: I think the distinction we really need to make is no one is proffering any evidence that comes from work for customers. All this was about stuff that was under NDA. What we're doing is pointing to publicly available facts that Mr. Lane had perceptual knowledge. That's not saying -- it's not a proffer of evidence of work that was done.

THE COURT: Well, they don't have to take your word for that. They're entitled to explore that. And to some extent or another, their ability to explore that was foreclosed. We'll get back to it in the morning because I need at least two minutes. But I'm troubled by it.

(Recess, 2:28 p.m.)

(Resumed, 2:38 p.m.)

(Jury enters the courtroom.)

MR. FLYNN: Bill, may we have Exhibit 568, please.

BY MR. FLYNN:

Q. Mr. Ratz, if you could turn to 568 in your binder, I'd like to discuss Pages 13 through 33. Are you with me?

A. Yes.

Q. 13 through 33 are various pieces of information that you posted on the Internet, correct?

A. That's true.
Q. Let's walk through, and if you would, please, tell us what they are. Let's begin with Exhibit A.
A. Exhibit A?
Q. What's that picture?
A. That's a picture of the green cylinder, the frame, and a blue cap.
Q. Whose frame is it?
A. It is what at the time, and we'll see in the next picture, was a version of our Rev. B frame.
Q. So it's CVT's or Cardiac's (Phonetic) or CardiAQ? I think I've gone through all the three names we use for that in this case.
A. Yes.
Q. Was your Rev. A frame or B?
A. Rev. B.
Q. And you posted it on the Internet, correct?
A. Yes.
Q. Now, would an engineer, someone learned in the art be able to look at that frame and infer anything about its dimension?
A. I don't think just from that picture, no.
Q. They couldn't infer anything from that picture?
A. On what topic, I guess? You can infer some things from it.
Q. Well, you were trying to communicate with someone, weren't

you?
A. I was.
Q. What were you trying to communicate?
A. I was trying to communicate to, I think as we mentioned earlier, a forum trying to get information on how to animate this expansion of the frame.
Q. Now, if we turn to the next page, what's depicted there?
A. The Revision B, a variation, a picture of the Revision B.
Q. What kind of files are these?
A. This is a screenshot, I believe, in this one.
Q. A screenshot of what?
A. A screenshot of a 3D model of the prototype -- not the prototype but a design of the prototype.
Q. And this is again Rev. B?
A. Yes.
Q. The one right before C, right after A?
A. That's correct.
Q. And this is posted on the Internet, correct?
A. Yes.
Q. Not secret at all, correct? Let's turn to Exhibit B. In the picture, what's depicted there?
A. That's that same Revision B, a picture of it in a tube as it would be laser cut.
Q. And what were you trying to communicate there?
A. Again, just to this forum of how I was trying to make this

expandable stent, that I could animate that. Ultimately I wanted to use it for purposes of putting it in investor presentations to help raise money, but in this case, just with this forum, I'm trying to get feedback on how to actually physically do that.

Q. And that expandable stent, that's not a secret, is it?

A. No, not what's listed here.

Q. Well, the notion of an expandable stent at the time you posted this on the Internet?

A. The notion of a metal frame that could expand? No.

Q. And the notion of an expandable stent delivered by a catheter, that's also not secret at this time, is it?

A. No.

Q. That's something everybody in the industry knew, correct?

A. That's true.

Q. Could you turn to the Page 20 of 33, please. What's that?

A. That's the flat image of that same rolled-up one that we had seen on the previous page.

Q. Now, that's the same kind of flat pattern you referred to several times in your direct exam today, correct?

A. Correct.

Q. This one is for Revision B, correct?

A. Correct.

Q. And this one was placed on the Internet, correct?

A. Correct.

Q. Without restriction?
A. Without restriction.
Q. On the next page, what do we see there?
A. That's a picture of that same Rev. B frame that we saw on the previous page, again in the expanded form, this time without anything else in it.
Q. Also posted on the Internet for anyone to see, correct?
A. In this same form, yes.
Q. On the following page, what do we see there?
A. That's an image that someone else had posted in response, just trying to give me feedback for how to model the expansion of a metal frame in this computer software.
Q. If we turn to Exhibit C which begins on Page 26 of 33, what's that?
A. That's an image of that same Rev. B frame in the rolled-up form.
Q. On Exhibit D, what's that?
A. That's that same frame in the expanded form.
Q. Are the ventricular or lower anchors plainly visible here?
A. Anchors are visible here, yes. It's not made clear in any of these postings that it's a mitral valve or what the intent is, so no one looking at this would know that they're ventricular anchors. We know that now in this courtroom because of what we discussed, but, yes, they are visible here.
Q. You think posted on the Internet this device would be a

mystery to people learned in the art; no one would be able to tell that those were ventricular anchors?
A. I -- I don't know.
Q. You knew they were, didn't you?
A. I knew they were ventricular anchors?
Q. Yes.
A. Yes.
Q. How long had you been working in the mitral space by this time?
A. I had been working in the mitral space at that time for, I don't know, six months.
Q. What's Exhibit E?
A. That same -- same expanded frame from a top view or bottom view.
Q. In what format is this depicted?
A. I can't tell from this image, but it's a screenshot of a solid model.
Q. Does that rectangle, does that tell you what kind of image this is?
A. Again, it's a screenshot of a solid image. There's a measurement here being taken.
Q. What's Exhibit F?
A. Another screenshot of a solid image.
Q. Now, you've mentioned "screenshot" a number of times. Did you also download any files? Were there any downloadable files

that you put on the Internet in connection with these images?
A. Yes, I think there were.
Q. What kinds?
A. If I remember correctly, I think IGES files, which have solid image information.
Q. Anything else?
A. I don't know for sure. I think other -- other images, maybe some flat patterns.
Q. Now, this information, it would all allow someone learned in the art to download it, correct?
A. If they were searching for my name, you know, they could find it.
Q. Are you suggesting that you put it on the Internet, but to the extent no one would find it, it's not publicly available?
A. No. I think it's publicly available.
Q. So I just want to know. Let's assume someone did find it.
A. Sure.
Q. They could manufacture the frame, couldn't they?
A. They could manufacture this Rev. B if they chose to. They don't know the material information or anything else, but they could cut it from any kind of metal or plastic if they wanted to.
Q. Well, I know you've told me before that it's common knowledge in the industry that these frames are typically made of nitinol, correct?

A. They could cut it from nitinol.
Q. And someone learned in the industry at this time would know to do that, wouldn't they?
A. If they wanted to, they certainly could.
Q. And so what you're doing here, at least with respect to Revision B, is putting your device onto the Worldwide Web where anyone learned in the art could manufacture their own prototype, correct?
A. That's correct. This particular revision was posted to the Internet.
Q. Now, I heard you say several times today -- I'm going to have to paraphrase, but you talked about the significance of holding a prototype in your hand, and you made some reference to the stiffness of the frame, the tensile strength of the frame. Do you recall that?
A. Yes.
Q. And you're suggesting that that conveys a great deal of information, correct?
A. It does.
Q. Isn't it true that for professionals learned in the art, that kind of hoop strength is measured, right? People don't rely on feeling a device. They have tools to measure?
A. It can be measured, and it typically is at later stages, but I would say we relied on it even without having to measure it to make changes often.

Q. Well, you testified in January of this year when you and I were together that CardiAQ did make these measurements, and they used sophisticated measuring machinery to do it, correct?
A. As we moved forward, we did.
Q. And you documented that information, correct?
A. I think we have reports on that in some instances, yes.
Q. What units of measure are used?
A. Typically newtons.
Q. Newtons, I do recall that's what you told me. And what's used to measure the newtons?
A. A radial force tester, a circumferential load cell base tester.
Q. And you measured hoop strength for Rev. B, Rev. D, and Rev. E, didn't you?
A. I don't recall.
Q. You measured for hoop strength for Rev. B, Rev. D, and Rev. E, and you recorded it at CardiAQ, didn't you?
A. Again, we may have. I don't recall offhand right now.
Q. You know you never shared those measurement figures with anyone from Neovasc, don't you?
A. Again, I don't recall if we took them, but, no, we did not share those specific figures with Neovasc, even if we had them.
MR. FLYNN: Your Honor, I would like to read from the deposition taken January 12, 2016, if I could.
THE COURT: Page cites?

MR. FLYNN: 172, Line 21, through 174, Line 13.
THE COURT: 172, 21, through 174, 13?
MR. FLYNN: Yes.
THE COURT: Any objection?
MR. SGANGA: I don't think it's impeachment, your Honor. It doesn't contradict the testimony.
THE COURT: Well, hold on. So --
MR. FLYNN: Your Honor, I'll read a smaller portion which will make it clear, 174, Lines 2 through 13.
THE COURT: Yes. Yes, that you may have.
MR. SGANGA: Objection but --
THE COURT: Overruled.
MR. FLYNN: "Question: Were those measurements ever provided to Neovasc? Answer: The frames that were used to produce that were provided to Neovasc. Mr. Flynn: Move to strike as nonresponsive. Question: This is a very clear question. Were those measurements as expressed in newtons as you've described and maintained by CardiAQ ever provided to Neovasc? Answer: The documents that expressed measurements in newtons were not provided to Neovasc."
Q. If we could, please, let's look at Exhibit 629. Mr. Ratz, do you recognize this?
A. I do.
Q. Did you prepare it?
A. I did.

Q. Let's turn to Page 7 of 39, please. In the first bullet you indicate, "The race is on, but recent activities will generate even greater interest in the overall TMVI space," correct?
A. Correct.
Q. And you indicate that Neovasc has completed a first in human implant, correct?
A. Correct.
Q. You also indicate that Edwards has done three cases in London and at least one in Bern, correct?
A. Correct.
Q. Now, Edwards is the medical device company that purchased your company, correct?
A. True.
Q. But at this point they are simply another competitor, aren't they?
A. That's true.
Q. If we turn to Page 8 of 39, you list the primary competition, correct?
A. Correct.
Q. And under the first bullet point, you identify Neovasc. True?
A. Correct.
Q. And what you say about Neovasc is that it's D-shaped. True?

A. Yes.
Q. Your device is not D-shaped, is it?
A. It's not.
Q. The second thing you say is it's 3-anchor. Do you see that?
A. Correct.
Q. Your device has 24 anchors, correct?
A. Yes. Here we're just noting the ventricular anchors.
Q. All right, let's say 12?
A. Correct.
Q. That's different. You say transapical. What do you mean by that?
A. That it is delivered between the ribs, through the chest, through the apex of the heart.
Q. That's different from your device, correct?
A. Uhm, in 2014 it was not. We had both a transapical system and a transseptal system.
Q. It's different than your device in any form in which you were working with Neovasc, correct?
A. That's true.
Q. Now, let's look at what you say about Edwards Lifesciences. You called that a self-expanding nitinol design, correct?
A. Uh-huh.
Q. Yes?

A. Yes.
Q. That's true of your device as well, correct?
A. That's true.
Q. You next say "behind leaflet anchors," correct?
A. Correct.
Q. You don't say "That's my 'aha' moment," do you?
A. That they're behind the leaflet anchors?
Q. Yes.
A. No.
Q. Have you ever accused Edwards of misappropriating a trade secret, a key invention of yours?
A. The invention is behind the leaflets and contacting the annulus. Their device did not do that.
Q. Did you know that at the time?
A. It was clear from the images, and they had presented that publicly and communicated it at their annulus meeting.
Q. By tracking Edwards, by looking at the images they published in the public domain, by attending their conference presentations, and by following their investor calls, you were able to determine that Edwards' device put anchors behind the leaflets but didn't contact the mitral annulus?
A. We didn't know for sure. I never had the device in my hand.
Q. I thought you just said you did.
A. I was going off of what I believed to be true from those

presentations, yes.
Q. So your source of information -- that's what I'm asking you about --
A. Yes.
Q. -- your source of information was three-fold: It was Edwards' presentations at the various professional conferences, number one, correct?
A. Uh-huh.
Q. The images of their device that Edwards published, number two? Yes?
A. True.
Q. And, number three, Edwards' earnings calls, correct?
A. True.
Q. And you learned quite a bit from all three of those sources, didn't you?
A. I thought I knew their device, yes.
Q. Thank you. Would you turn, please, to Page 12 of 39. Now, this is headed "Intellectual Property," correct?
A. Correct.
Q. And what you're doing is articulating CardiAQ's strategy with respect to intellectual property. True?
A. Just, yes, essentially providing a status update, where things are at regarding our intellectual property for the Board.
Q. And in your second bullet point, you say, "Focused on

addressing claims related to latest embodiment while covering competitive products (EW, Neovasc, et cetera)." Do you see that?

A. Uh-huh.

Q. And what that means is that what you were doing was describing your patent claims broad enough to cover your own device and the devices of your competitors, correct?

A. That's true. I think that's common in the IP practice to make sure we're strategically covering our intellectual property to make sure it's as broad as it can be and that it gives us freedom to operate and addresses competitive devices that might be out there.

Q. Well, so what you're doing is taking your patent claims, your allegations of what you own, what you've invented, and covering not only your own inventions but trying to make them broad enough to cover the inventions of your competitors, correct?

A. Well, if what we have invented is broad enough to cover what somebody else has invented later, then I would agree.

Q. And you're setting out to do that as a strategy here, aren't you? You don't have any particular invention in mind. You're articulating a broad policy?

A. Correct.

Q. And the policy applies to Edwards, Neovasc. I assume "et cetera" is meant to mean anyone else who comes down the

pike, correct?
A. That's correct.
Q. If you would, please, turn to Exhibit 173 of your binder, and let's start from the bottom up. Could we highlight the e-mail at the bottom of the page. A little farther down, the one at the very bottom. That's from you to a number of people within CardiAQ, correct?
A. Yes.
Q. And it's dated February 3, 2014?
A. Yes.
Q. And what you're doing is reporting that Neovasc has completed its first in human, correct?
A. That's correct.
Q. Now, let's look above, the e-mail from a person named Jack Lips to Rob Michiels and Brent Ratz. Who's Jack Lips?
A. Jack Lips is someone that was a clinical specialist for us. I'm trying to think when he joined, but I think sometime, let's see, in October of 2014?
Q. When you say "clinical specialist," do you mean a doctor?
A. I think he was trained as a nurse practitioner, and then he worked in the device space, and, you know, had worked for other medical device companies as supporting cases for, you know, industry.
Q. So in this e-mail, what Jack Lips is doing is reporting to you and Mr. Michiels that he's going to be working on a

confidential Neovasc implant, correct?
A. No. He's just saying he's supporting cases at Dr. Verheyes' request. "Coming Friday in Antwerp. I know him well. Will ask him how things went."
Q. So he's volunteering to get information from a doctor who's working for Neovasc and report it to you, correct?
A. That's true.
Q. And you understood that at the time, correct?
A. I understood that he was going to ask him how things went, yes.
Q. Well, it goes a little further than that as the e-mails progress, doesn't it? Not just how things went?
A. Yes, it may.
Q. Well, we can tell for sure if we just read the document, right? Let's blow up the e-mail that begins on February 4, 2014, at 11:57 a.m. that Rob Michiels wrote. Do you see that?
A. Yes.
Q. Now, to orient us all, Mr. Michiels is your CEO at the time, isn't he?
A. Correct.
Q. He says "Start of list of questions for Jack below. What do you want to add? We will probably only get a few answers but might as well try." And the questions that follow are detailed confidential information with respect to that patient, correct, and with respect to Neovasc's device?

A. Again, I don't -- it may be confidential. I think the thought from Jack was, if he is comfortable sharing it, then, you know, we might as well ask him.
Q. Well, Jack is not the one who's sharing it, right? Jack is offering to try to get it from the doctor who performed the implant, correct? And you were comfortable with that, weren't you?
A. I was comfortable with him asking, sure.
Q. And you knew all of this stuff is confidential patient information, don't you?
A. I don't know that it's all confidential patient information, but I think it was mostly just asking if he had information about the device and the procedure.
Q. Well, some specific questions, right? They want more detail on the patient, the patient's age, medical history, et cetera. My medical history is confidential. Do you think yours is?
A. Probably.
Q. So you knew that patient's was too, correct? Yes?
A. Yes.
Q. Whether this was a compassionate case, meaning was the patient so ill he had no other recourse, he or she, correct?
A. Correct.
Q. That's confidential. Whether you are so ill that you have no other recourse is confidential information, isn't it?

A. It could be, yes.
Q. It could be or it is?
A. Well, I think this is all information -- a lot of this information is information that's typically published in a press release as well, if companies care to do so.
Q. Well, if it were published in a press release, you wouldn't have to get a nurse practitioner to approach a doctor and forward it back to you, correct? This whole exercise would be unnecessary, true?
A. True.
Q. The current patient status, how the patient is doing, that's confidential, isn't it?
A. Yes. All of this could be considered confidential, I would think.
Q. Well, I want to take it one step further, respectfully, Mr. Ratz. Not that it could be but that it obviously is. It's confidential information, isn't it?
A. Again, if the doctor thought it was appropriate to share it, that's up to him. It was not my request that Jack talk to him.
Q. Well, you don't have any idea whether the doctor knows that if he does share this information with a nurse practitioner, that nurse practitioner is going to turn around and give it to your company, do you?
A. I don't know.

Q. And you didn't do anything to find out, did you?
A. I didn't.
Q. Instead, the top e-mail, let's look at that. This is from you, correct?
A. Yes.
Q. Rather than try to find out whether it's appropriate to obtain any of this information, you say "Pretty good list to start from," correct?
A. That's true.
Q. And you add more, "Annulus diameter," in parens some details there. The size of different parts of this patient's heart are confidential, aren't they?
A. They likely would be confidential.
Q. Well, you know they're confidential, don't you?
A. Yes.
Q. And you knew it at the time, didn't you?
A. I probably knew at the time, yes.
Q. Let's turn to Exhibit 175, please, and I'd like to blow up the e-mail in the middle of the page. January 17, 2014, at 6:14 p.m. Brent Ratz wrote. This is your e-mail, isn't it?
A. It is.
Q. And with respect to your own information, you designate it confidential, don't you?
A. We did in this case.
Q. It's the first thing you say, isn't it?

A. That's true.
Q. The next thing you say is "All: We received some confidential information (confirmed from multiple sources) that we wanted to share with the Board as soon as possible. It has come to our attention that both Edwards and Neovasc approached a physician group in Vancouver to do their first in human patients with their respective transapical mitral valve implantation system. "
This is another example. You know you're receiving confidential information with respect to Neovasc's program, correct?
A. That's correct.
Q. And you're receiving it from multiple sources, correct?
A. That's correct.
Q. And you're reporting it to your Board, correct?
A. Correct.
Q. You end that you're going to provide further updates if and when the information becomes available, correct?
A. That's correct.
Q. I'd like to change topics, Mr. Ratz, and put on the screen, if we can, a declaration you filed in this case just a few weeks ago. Could we highlight the title here. Do you recall this?
A. I do a lot of declarations, so do you have the document number?

Q. I don't have the document number, but we'll cover it in detail. Do you recall filing a declaration in opposition to Neovasc's motion for partial summary judgment?
A. Yes.
Q. And you do do a lot of declarations, and by virtue of that, unfortunately, you're aware that like your deposition, the declaration is subject to the penalty of perjury, correct?
A. Yes.
Q. Everything needs to be the truth, the whole truth, nothing but the truth, correct? If you would, please, let's turn to Paragraph 5. Now, Paragraph 5 begins with a reference to the EACTS meeting on September 13, 2008. Do you see that?
A. I do.
Q. And that's something you testified about in your direct exam, correct?
A. Yes.
Q. If we could, could we put up on the right side of the screen Exhibit 1396, Page 6 of 7, and if we could blow up the drawing in the bottom right-hand corner. Do you see that, Mr. Ratz?
A. I do.
Q. Do you recall testifying about that yesterday?
A. Yes.
Q. What is this?
A. It's a sketch of the mitral valve on the lower left and

the aortic valve on the upper right, just noting where they share that space in between there and where the trigones are on the top and bottom.

Q. Now, your indication of where the trigones are, are you indicating that they are part of the mitral annulus, the aortic annulus, or both, or neither?

A. I'm assuming that they're part of the mitral annulus here based on my conversation with Dr. Quadri at that time.

Q. At this point, did you think the trigones share space with both annuli?

A. I think it's on either side of the mitral valve in that mitral aortic space in between.

Q. So it's hard to say for a layperson, hard to understand where they are exactly?

A. Again, this is the early stages of mitral here, and I'm learning from Dr. Quadri as we're discussing it and as we're sketching it.

Q. Mr. Ratz, I feel that I'm learning from you with respect to this too, and I don't mean to criticize your knowledge of anatomy at the time of this drawing. All I'm trying to do is get some orientation with respect to the sketch. At this time, did you think the trigones were part of both annuluses?

A. Yeah, I wasn't sure. I think there's a shared space in between, so I very well may have thought that it was a part in between. I can't say at this point what I was thinking then.

Q. I accept that. This reference to the trigones, however, this is the only reference you've been able to find in any of your lab notebooks or any of CardiAQ's internal documents during the time it was doing business with Neovasc, correct?
A. I believe that's true. I think there's another sketch where it's not labeled, if you want to look at it with the arrows, but I think, yes, this is the only time that I'm aware of that it's written down.
Q. In fairness to you and, like, as in January, I do want to be fair to you, so let's turn the page in the notebook and put the next page up too. If we could, let's highlight the hand drawing on the left-hand side. And the arrows you're referring to, that one and that one?
A. That's correct.
Q. Okay. So the page before and this page, both of which are written in 2008, September of 2008 --
A. Uh-huh.
Q. -- those are the only references to trigones you've been able to find in any of your lab notebooks or in any of CVT's documents during the time it was doing business with Neovasc, correct?
A. That's true.
Q. And you've looked hard, haven't you?
A. I think the attorneys have gone through everything thoroughly, yes.

Q. Thank you. Now, Mr. Ratz, with respect to your communications with Randy Lane, you never told Mr. Lane that two anchors of a transcatheter mitral device should land on the two fibrous trigones, did you?
A. No.
Q. You didn't tell Randy Lane that one anchor should land on a fibrous trigone, did you?
A. No.
Q. You didn't tell Randy Lane that any anchor should land in the region of a fibrous trigone, did you?
A. No.
Q. You and Mr. Lane never discussed fibrous trigones, did you?
A. I don't think we ever did.
Q. Now, your testimony is not that the mitral annulus and the fibrous trigones are the same thing, is it?
A. I believe the trigones are part of the mitral annulus.
Q. Well, that's different than what I asked you. There are parts of the mitral annulus that aren't the fibrous trigones, correct?
A. That's true.
Q. And, according to you, there's a part of the mitral annulus that is two fibrous trigones, correct?
A. That's true.
Q. There are two of them, not one, not three, two, right?

A. True.
Q. And they're each in distinct places, correct?
A. True.
Q. And they're distinct kinds of tissue, correct?
A. Correct.
Q. Different than other aspects of the mitral annulus, correct?
A. Correct.
Q. Now, it's not just Randy Lane, right? You never uttered the word "fibrous trigone" to anyone at Neovasc, did you?
A. I did not.
Q. Let's take a step further back. You never told Mr. Lane that ventricular anchors for a mitral device should land in any particular location, correct?
A. That's correct.
Q. Your device, the CVT device in all the forms that Neovasc saw, it was indifferent with respect to where any one of its twelve anchors would land in the annulus, correct?
A. Correct. We did not rotate the device or align it in any way when we deployed it.
Q. And when I was examining you in January of this year, you agreed that the fact that you're not required to rotate your device in a particular way is a design difference that makes it distinct from Neovasc's device, which has to be rotated and oriented in a precise way, correct?

A. I think that is a distinction.
Q. Now, you helped draft your company's clinical -- well, the brochures for doctors to engage in your clinical studies, correct?
A. That's correct.
Q. And you helped prepare the clinical investigation plans? True?
A. True.
Q. And those plans instruct the doctors on how to orient, how to insert the devices, correct?
A. Yes.
Q. And those documents don't mention fibrous trigones at all, do they?
A. No.
Q. And that's because that's not something particular to how you deploy your valve, is it?
A. It's not required to teach a doctor how to accurately deploy our valve, no.
Q. An anchor that would contact a trigone isn't something inherent in CardiAQ's procedure, is it?
A. Labeling an anchor as specifically targeting a trigone? Is that what you mean?
Q. I mean telling the doctor, "You have to perform the procedure in a way that puts an anchor on a trigone."
A. No, that's not part of our training.

Q. And that's because it's not important with respect to the anchoring of your device that any one of the twelve anchor on a fibrous trigone, correct?
A. It's not necessary to rotate or align it. Again, we've got twelve anchors equally spaced. By nature of the annulus, it's going to happen, but we don't request that they do anything specific or need them to do anything specific for that to happen.
Q. So in your inventive phase, when you're coming up with your idea, your platform technology, or however you want to describe it, you never thought in your mind about an anchoring scheme that would require a deliberate, intentional anchoring on a fibrous trigone, correct?
A. That's correct.
Q. And you certainly never thought about an anchoring scheme in which you would put two anchors on the two trigones and a third anchor under the posterior leaflet onto a posterior shelf, correct?
A. Not specifically in that configuration, we never thought of just that.
Q. That never entered your mind, did it?
A. No.
Q. If we could turn back to your declaration, please. Let's look at Paragraph 8 and the whole screen for now. You say in Paragraph 8 that by June, 2009, Dr. Quadri and you had

developed a prototype TMVI device, and that at that time, no TMVI device had ever been commercialized or even implanted in a human, period. Do you see that?
A. Yes.
Q. With respect to commercialized, that's a bit of hyperbole, isn't it? Today, no TMVI device has ever been commercialized, has it?
A. That's true.
Q. Yours has not, correct?
A. No.
Q. So, again, turning all the way back, when we were looking at the DeBacker article and you were suggesting that your Revs. C, D, and E had solved these issues, even your current generation device hasn't solved these issues to the extent that it's been approved by any regulatory body, correct?
A. I think, I mean, solving the technical issues is different than obtaining regulatory approval and conducting clinical trials. It's true in the sense, you know, still none of our devices and no one else's devices have been approved for commercial use.
Q. Now, by June, 2009, you were aware that other companies, other inventors, were attempting to develop a TMVI device, weren't you?
A. Yes.
Q. And you knew by the time you met Neovasc, you knew Neovasc

had other mitral customers, didn't you?
A. Surgical mitral customers.
Q. You knew that?
A. We knew that they had worked on the Sorin Mitroflow valve.
Q. How did you know that?
A. We were told by them, I believe, or told by other people in the industry.
Q. And you were aware of the Sorin valve in connection with your own work, weren't you?
A. I was aware of it just as a valve that was on the market.
Q. Well, hadn't you made a notebook entry in your lab notebook at about the same time you made your single reference to fibrous trigones that Sorin was in the space but there was still room?
A. In which -- I think I have -- I recall those notes from the EACTS meeting, but without looking back on it, I'm not sure what valve it was referring to or...
Q. Well, let's go back and find out. If we could look at Exhibit 1396 again, Page 5 of 7. And could we -- well, strike that. Let's just move on. Exhibit 268, please. Exhibit 268 is a press release dated May 21, 2010, correct?
A. Yes.
Q. Did you prepare this?
A. I don't recall.
Q. Let's turn to the second page. If we could highlight

under the series of bullet points the paragraph that begins "Other companies." Now, this press release in May of 2010, this is announcing its successful implantation, correct?
A. Correct.
Q. And you're doing it in advance of EuroPCR 2010, correct?
A. Correct.
Q. And at that conference, you intend to make a presentation?
A. That's true.
Q. And the press release states in part, "Other companies have published results for minimally invasive transapical approaches to mitral valve replacement." Do you see that?
A. Yes.
Q. Do you recall if you're the person who wrote that? Are you the source of that information?
A. It may have been our PR firm. We had a PR firm that was preparing press releases, but I probably reviewed this.
Q. Were you the source of facts for them with respect to CardiAQ?
A. Probably between myself and Rob Michiels.
Q. So by this time, you were aware that other companies were reporting such results, weren't you?
A. Yes. I think Georg Lutter had published some results early on with the apical tethering approach of the Lutter valve in work that he had done.
Q. Well, this says "other companies," not singular. But were

you aware of one or more than one?
A. I know of Endovalve at that time as well, so probably referring to them.
Q. So you know the space isn't occupied by CardiAQ alone, correct?
A. That's correct.
Q. And other companies are publishing information in the public domain, correct?
A. Correct.
Q. And TMVI in general is the subject of these professional conferences, correct?
A. It is a subject of these conferences, yes.
Q. And these conferences are attended by physicians, by medical device designers, and by investors, correct?
A. That's true.
Q. And you've already indicated you yourself, simply through conferences and publicly available information, learned quite a bit about the Edwards device well before Edwards acquired you, correct?
A. I think it might be a stretch to say "quite a bit," but I thought I had an understanding of how it worked based on my experience and based on what I had seen.
Q. Well, you at least knew that it went behind the leaflets, correct?
A. Yes.

Q. And you couldn't go behind the leaflets in a mitral device without going through the chords, could you?
A. That's probably true.
Q. That is true, isn't it?
A. Yes.
Q. And you knew that at the time, didn't you?
A. I did know that.
Q. Now, if we look at -- let's put up the declaration by itself. Can we look at Paragraph 9. You say here, "To facilitate the ongoing development from approximately June 2009 through April 2010, CardiAQ engaged Neovasc..." Do you see that?
A. Yes.
Q. And the engagement was to supply tissue components for your device prototypes, correct?
A. That's correct.
Q. So that's a limited engagement, correct?
A. Correct.
Q. And it's for a limited period of time, correct?
A. Purchase order to purchase order.
Q. The entirety of the relationship lasted nine months, correct?
A. Yes, nine or ten months, depending on when you start or stop.
Q. And throughout that nine-month relationship, you paid

Neovasc a total of $40,000, or thereabouts, correct?
A. That's probably true. I haven't added it up.
Q. Now, yesterday you said that you felt -- well, you described it as being in regular contact with Neovasc, and you said that that included one to two phone calls a month. Do you recall that?
A. I do.
Q. Now, in your declaration -- we'll get to it, but maybe we can save some time -- in the declaration you filed with the Court, you said that that was one phone call a month. Which was it?
A. I don't recall. I didn't go back and look at how many phone calls we had, so that's why I'm estimating.
Q. I don't mean to bother you, but you estimated for the Court on one day that it was one phone call a month and yesterday before the jury that it was two, which doesn't sound like a big difference to me other than this: Doing the simple arithmetic over about a nine-month relationship, that's the difference between nine phone calls on one hand and eighteen on the other, so it ends up being more significant than it first sounds. Do you know which is true?
A. I -- I don't. I have not gone back through. I could probably go back to my notebooks and look for the entries and add it up, but I haven't gone through that exercise, so --
Q. So you haven't done it?

A. I'm going off the best of my recollection.
Q. And the best of your recollection a few months ago it was one time a month, and the best of your recollection yesterday was that it was one or two times a month?
A. That's correct.
Q. All right. Now, let's look at Paragraph 16, please. Now, here's an important one. Here you say, "In August 20-21, 2009, Dr. Quadri and I conducted animal trials using the fully assembled Rev. C prototype TMVI devices. A true and correct copy of excerpts from my lab notebook, including the entries from these animal trials, is attached hereto as Exhibit 111."
Now, that's Trial Exhibit 1394. Let's put it on the right side of the screen.
Now, this is the animal study where you learned the Rev. C device wasn't working properly, correct?
A. That's correct.
Q. And you say you cut through the chords to free the anchors, correct?
A. Correct, cut through the skirt to free the anchors.
Q. I'm sorry, I misspoke. Thank you. You did cut through the skirt to free the anchors. Now, in your lab book, none of the pages contained in this excerpt discuss anchors moving through the chords behind the leaflets and attaching on the annulus, do they?
A. No, I don't think they do. I don't -- I don't know that

they do.
Q. You certainly didn't point to any for the jury during your direct exam, did you?
A. No.
Q. Let's look at Paragraph 17. In Paragraph 17 you state that after these August animal studies, you communicated to Neovasc the changes that you intended to make to the TMVI device, and you attach an August 31 e-mail, Exhibit 112. That's Exhibit 153-H for purposes of trial. Let's look at that. Can we blow up Mr. Ratz's e-mail. Now, in this e-mail you're writing to Kathleen Hung of Neovasc, correct?
A. Correct.
Q. You had a good relationship with Kathleen Hung, didn't you?
A. I think so.
Q. She left you with the impression that she was doing her best to do a good job for you and CVT, didn't she?
A. Absolutely, sure. There was no reason to think otherwise.
Q. And in fact there were plenty of reasons to think she was doing her best to do a very good job, correct?
A. I think she was, yes.
Q. Worked under some tight time frames, correct?
A. Sure.
Q. Put in long hours? Yes?
A. As far as I know, yes.

Q. Did everything she could to help you, didn't she?
A. I think so.
Q. In this e-mail reporting on the animal studies -- well, strike that. This e-mail doesn't report on the animal studies, does it?
A. We talk about what we want to change with respect to the next implants and asked her to send it back, but we're not reporting on the animal studies here.
Q. Well, what's important for me here is that you confirm, this e-mail says nothing at all about the concept of anchors moving through the chordae tendinae behind the leaflets and contacting the annulus, does it?
A. No, this e-mail does not.
Q. Not a word of it, correct?
A. Not a word of it.
Q. Let's look at Paragraph 19 -- I'm sorry, 18. We just skipped one. Paragraph 18 says, "On September 4, 2009, Dr. Quadri and I further discussed the significance of designing the ventricular anchors of CardiAQ's TMVI device to interact beneficially with the native chordae." And you cite a particular page of your lab notebook, correct?
A. Correct.
Q. And you say particularly "native chordae," correct?
A. Correct.
Q. And this is all in the context of your "aha" moment about

moving through the native chords behind the leaflets onto the annulus, correct?
A. Yes.
Q. So that's what you're -- at this point you're communicating to the Court, not to the jury, but what you're trying to communicate is that this lab notebook reference relates to your supposed "aha" moment, correct?
A. I think that it gave some indication, yes.
Q. Okay, fair enough. Let's take a look at that lab notebook reference in particular. If we look at Exhibit 1394, Page 12 of 21, that's the reference, correct?
A. Yes, I believe so.
Q. Now, if we look at the bottom, the portion that begins on the left-hand side of the page "IP" all the way -- I'd like to encompass the signature there too. Thank you, Bill. Farther to the right. That's the discussion you're suggesting relates to the concept of putting ventricular anchors through the native chords behind the leaflets and onto the annulus?
A. That's one part of it that was cited, yes.
Q. Do those words appear here anywhere?
A. Just integrating chords into the design to use chords on the free edge of leaflets to reverse the forces.
Q. And then you have that signature. Do you have a practice with respect to signatures like that where you'll sign and date your lab notebook?

A. On occasion. I would say I wasn't religious about it.
Q. I've seen it a number of times. What does it signify?
A. I try to do it, you know, when we thought there was something novel, you know, typically if I was there with Dr. Quadri.
Q. It suggests an invention, doesn't it?
A. I think, yes, to try to sort of denote it.
Q. I'm not quarreling with the idea that it suggested an invention, but it does, doesn't it?
A. Correct.
Q. Okay, so this invention is something you actually did file a patent on, didn't you?
A. An element of this, yes.
Q. Well, are you able to look at this drawing and segregate what element relates to your idea about artificial chordae and what element relates to native chordae?
A. I think we were thinking about chordae in general here. There's a sketch in the middle separately where we're talking about chords onto the prosthetic leaflets as well.
Q. This sketch involves prosthetic leaflets, doesn't it?
A. That sketch in the middle there, yes.
Q. Where in this document is there any reference to the native chordae?
A. I think we're not distinguishing on the lower left there as we talk about it.

Q. Well, the lower left, this idea of using chords on the free edge of the leaflets to reverse forces, that was your idea for mechanical chords, wasn't it? That's one of the things those mechanical chords were designed to do?
A. It was the idea of using chords in general. I don't think we made a distinction as we were discussing it there.
Q. Well, the invention you patented -- let's step back. I heard you say this afternoon -- I had this issue in mind when I heard you say it -- that you typically wait some great length of time between your inventive concepts and the time patents get filed.
A. I think it -- I think it varies.
Q. Well, you didn't say it varied this afternoon. You said it was months, right?
A. We've waited in some cases. In some cases, if we've had a preliminary application ready to go, then we've tucked things in right at the end of that.
Q. But the real truth is that it varies, it depends, right? You don't always wait a good long time. Sometimes you move much quicker?
A. In some cases, we have.
Q. And in this case, with respect to these mechanical chords, you moved much quicker, didn't you?
A. With respect to the prosthetic chords, we did include that as well into an application.

Q. And you did that about three weeks after you made this notation, didn't you?
A. We may have.
Q. You did, didn't you? Do you want me to get the patent out?
A. We can get the patent out if you want. I -- I'm sure you've looked.
Q. Mr. Ratz, will you take my word for it, or do you want to see the patent?
A. I'll take your word for it.
Q. All right, okay. Let's turn to Paragraph 19. Paragraph 19 says, "On September 11, 2009, we undertook additional animal studies with the Rev. C frames." And again there's a reference to your notebook. "Prior to these studies, we made additional revisions to the Rev. C prototype frames, including pulling back the ventricular skirt to have a greater length of exposed anchors in our frames. The picture of one of the assembled Rev. C devices used in these September animal studies is below."

Before we turn to the picture, let's turn to the notebook, again, Exhibit 1394. Is there anything in Exhibit 1394 that expresses the concept moving ventricular anchors through the native chords behind the leaflets and onto the annulus?
A. No. It was just describing the picture of the implants, the revised Rev. C frames that we used for the study.

Q. Okay, so that concept is not in your notebook, is it?
A. It's not described here, no.
Q. Let's turn to Paragraph 20. Now, above Paragraph 20 is the picture you described in the preceding paragraph, correct?
A. Correct.
Q. All right, let's now focus on 20. 20 reads, "Following the September animal studies, we made additional modifications to our TMVI device design, transitioning the device from the Rev. C design to our Rev. D design."

Now, for the benefit of the jury, the highlighting here, this document was submitted by CardiAQ partially under seal, so the yellow highlighting is not Neovasc's attempt to draw your attention to anything. It's just what was submitted to the Court. This is the material that they had blacked out, and it's reflected in yellow highlight here.

It reads, "These revisions, including moving the portion of the ventricular skirt extending between the ventricular anchors, widening the ventricular part of the device, and altering the shape of the ventricular anchors." And then here's the important part, Mr. Ratz: "The goal of these changes was enabling the ventricular anchors of CardiAQ's TMVI device to move freely through the chords, get behind the native leaflets, and anchor on the native mitral valve annulus."

You go on to describe this, quote, "This transition from the anchoring mechanism in the Rev. C design to the anchoring

approach embodied in the Rev. D design was one of the most -- if not the most -- significant steps CardiAQ took in developing a functional TMVI device," correct?
A. Correct.
Q. Now, that goal as you've expressed it in your declaration, that appears nowhere in your lab book, correct?
A. Yeah, I don't know.
Q. You don't know whether it does?
A. I don't think we've shown in this time frame there anchors going between the chords.
Q. Well, these changes, the concept I'm trying to draw out, in your declaration you describe a number of changes, and then you state under oath those changes were made with a particular goal. I'm not -- I don't quarrel that you made the changes. I'm not even really quarreling whether that was your goal. I just want to confirm right now that that goal isn't written down anywhere in your lab notebook, is it?
A. The goal of enabling ventricular anchors to move freely through the chords behind the leaflets and anchor on the native mitral valve annulus?
Q. Correct.
A. No, I don't think that goal is expressly written in my notebook.
Q. Now, on the next page of your declaration you've attached a sketch "depicting the ventricular anchors of CardiAQ's Rev. D

device engaging native mitral valve annulus and capturing the native mitral valve leaflets." Do you see that?
A. Yes.
Q. Who wrote that? Who drew that sketch?
A. I think one of the illustrators for the attorneys.
Q. So it was drawn for the purpose of this litigation, correct?
A. I believe it was, yes.
Q. So this sketch, this appears nowhere in your lab notebook, correct?
A. No, this sketch does not.
Q. This sketch appears nowhere in any of CardiAQ's internal documents at any time it was doing business with Neovasc, does it?
A. No.
Q. This is purely made up for this litigation, correct?
A. It was created for the purposes of this submission, yes.
Q. Let's turn to the next paragraph, Paragraph 21. That states, "On October 12, I sent details regarding our new Rev. D frame concept to Mr. Lane, including an engineering diagram and a flat pattern for the new design," and you attach a true and correct copy of your e-mail. You call that Exhibit 113. Let's put up 2119. And could we enlarge the top half of that document, put it on the screen by itself.
Do you recognize this document, Mr. Ratz?

A. I -- I don't. Only from your opening slides.
Q. You've never seen this before?
A. I -- honestly, I was surprised when I saw it in your opening slides because it didn't look familiar to me.
Q. Let me see if I can refresh your recollection. You know what metadata is, don't you?
A. Metadata?
Q. Yes.
A. Uhm, no. Enlighten me.
Q. I'd be happy to. Metadata is data that is contained in PDFs and word processing documents that helps to show, or shows conclusively, who wrote the document and equally importantly when the document was written. The metadata behind 2119 shows that you wrote it in February of 2010. Do you deny that?
MR. SGANGA: Your Honor, I object for lack of foundation.
THE COURT: Excuse me?
MR. SGANGA: I'm going to object for lack of foundation, the question about metadata that the witness has not seen.
THE COURT: Let me see you at sidebar on that.
SIDEBAR CONFERENCE:
THE COURT: Are you disputing that he authored this document?
MR. SGANGA: No. He's got no recollection of it, so

that's clear from the record, but there's certainly no foundation that he's familiar with this alleged metadata.

THE COURT: Well, what do you want to me to do? Have a separate witness to testify about the metadata?

MR. SGANGA: They should be showing the witness the document that allegedly shows this. This is not an attempt to refresh recollection about some prior testimony.

MR. FLYNN: No, I think it is an attempt. All it is right now is an attempt to refresh his recollection.

THE COURT: Are you showing him the actual document?

MR. FLYNN: I think he's got the document in his binder, and I think he's looking right at it. The metadata I don't have available for this exam, which is why I'm trying to refresh his recollection. When we get to our case, we can certainly recall him and show him the metadata.

MR. SGANGA: This is my problem. It's attorney testimony about the existence of some evidence that we don't have.

MR. FLYNN: No, it's not. Right now it's just an attempt to refresh his memory. He hasn't answered that question yet.

THE COURT: So you're not attempting to refresh his recollection. That's not what you're doing?

MR. FLYNN: I'm sorry.

THE COURT: You don't have to apologize, especially

because nobody here is sorry, but that's fine.

MR. FLYNN: I won't burden the record, but I --

THE COURT: Showing him a document that doesn't refresh his recollection, he can't testify that the metadata reflects that it's him and therefore it must be him, on the one hand. On the other hand, if there's no dispute about this and they can call some computer forensics somebody or other --

MR. SGANGA: Your Honor, what I can tell you is that in my discussion with the witness, he's not sure where this document came from. Now, it may be that he was involved in editing it at some point.

THE COURT: You can try and refresh his recollection. If he can't, he can't, but we're also going to be annoyed if we get through this whole computer forensic exercise and -- make sure he sees the document, if it refreshes, but you can't testify that --

MR. FLYNN: No, I didn't think I could.

(End of sidebar conference.)

MR. FLYNN: Thank you, Mr. Ratz. I apologize for leaving you waiting here.

THE WITNESS: No problem.

MR. FLYNN: Could we have, please, Exhibit 1406 on the screen, and in particular Page 116 of 303. If we could blow up, Bill, the top eighth of that document, including the date.

BY MR. FLYNN:

Q. Do you see the date, Mr. Ratz, February 22, 2010?
A. Yes.
Q. Do you see the dash and your handwriting that follows?
A. I do.
Q. What does it say?
A. "Assembled justification memo to KT for history of TMVI revisions."
Q. "A through E"?
A. "A through E."
Q. Now, compare that with Exhibit 2119, please. Put them both on the screen, please. Thank you, Bill. Let's blow up the handwriting again and the heading of the document. Do you see that?
A. I do.
Q. Does that refresh your memory that you prepared this document on about February 22, 2010?
A. Again, it seems logical, given the notebook. I just don't -- I don't recall having created it.
Q. Your notes say you did, don't they?
A. My notes say I did. Actually, when I saw your opening statement, I went back to my computer and tried to search for it, and I could not find it.
Q. Well, my question was, your handwritten notes say you did this, don't they?
A. Suggest that I did create a justification memo.

Q. Well, they say you created a justification memo, and then 2119 is in effect the justification memo, isn't it?
A. It looks like it, yes.
Q. And it matches Revisions A through E, doesn't it? Take your time. Look at the justification memo. I've had more time with it than you perhaps most recently, but I know it covers Revisions A through E. And if you take a moment, I think you'll quickly satisfy yourself that that's exactly --
A. I'm happy to discuss it.
Q. All right. Does that indicate what your purpose is in writing Exhibit 2119? Does your handwritten note refresh your memory as to why you're doing it?
A. Yes. If I created it, it seems likely that it would have been for KT. Kalathi Thyagarajan was our vice president of RA, QA, and clinical at the time.
Q. Is he someone who came over with the folks from Endovalve?
A. Not Endovalve. He had been with CoreValve on the aortic valve side.
Q. I'm sorry, I misspoke. And your note says that you're doing this to provide it to him, correct?
A. Yes.
Q. Around February 22, 2010, it was your practice to be as complete and candid as you possibly could with that person, correct?
A. Generally speaking, yes.

Q. Were there any exceptions at about that time?
A. No, I don't think so.
Q. So you agree with me, your practice at that time was to be as candid and forthcoming with this person as you possibly could, correct?
A. Yes.
Q. Nowhere in your memo describing the various changes from Revisions A through E do you say the words "through the chords, behind the leaflets, and onto the annulus." You don't describe that anchoring concept at all, do you?
A. Again, I don't know. I have not seen this document recently.
Q. By February 22, 2010, you've had your alleged "aha" moment, haven't you?
A. February 22, 2010?
Q. Well, to be fair to you, Mr. Ratz, by that time you're describing Rev. E changes, and you claim to have had the "aha" moment between Rev. C and Rev. D, right? So this is well past what you claim is an "aha" moment, right?
A. Yes.
Q. Months past?
A. Yes.
Q. Two iterations of the device past, correct?
A. Correct.
Q. Let's put up by itself 2119, and if we could, I would like

to pull out the section beginning Rev. A, December '08 through January, '09, "Initial transcatheter mitral valve implantation frame." And if we could highlight it all the way through but not including the section that says "Tissue Valve." Bill, can we get that text right before "Tissue Valve" included in the blowup, if possible. I'm so concerned this document is not easy to read, so let's start with the section where we begin only through "Pattern." See if we can make that easier to see.

Now, the second bullet point there, Mr. Ratz, under "Pattern," I'll read it aloud so we can all see it. I apologize. It reads, quote, "Incorporate CVT's platform technology (axial clamping, anchoring through foreshorten ing) to the mitral position."

Now, at that time, that is in fact what you were describing as CardiAQ's platform technology, correct?

A. Correct.

Q. Now, let's skip a bullet point. Let's highlight or read, quote, "As the frame expands, opposing anchor features come together creating a clamping action above and below the native mitral annulus." Do you see that?

A. Yes.

Q. That was your platform technology, wasn't it?

A. Yes, at that time.

Q. The next bullet point, "Keep native leaflets and subvalvular apparatus intact." Do you see that?

A. Uh-huh.
Q. Now, I've heard throughout the course of the trial references to keeping the subvalvular apparatus intact, and that's not an obvious phrase to me. What does that mean?
A. I think it's obvious to the medical community and folks that were familiar with surgical mitral valve replacement that you did not want to damage the papillary muscles or the chords or cut those in any way because if you lose that tie to the ventricle, then the heart does not function as well.
Q. So you want to keep the leaflets, the chords, and the papillary muscles from being torn or damaged, correct?
A. That's correct.
Q. And that's been a goal that's a stated goal as early as December, '08, correct?
A. Yes.
Q. And that doesn't change, does it?
A. No.
Q. So before an alleged "aha" moment, after an alleged "aha" moment, it's always been one of CardiAQ's desires, correct?
A. That's correct.
Q. And, as you indicated, that desire, that's no trade secret. That's everyone's desire, right?
A. That's true.
Q. Commonly known, you don't want to damage the native leaflets, the chords, or the papillaries, correct?

A. Correct.
Q. And your last bullet point in this section, it reads, "Create a more robust seal around the perimeter of the implant and improve the parivalvular leak prevention." What does that mean in simple terms?
A. Just that we don't want the valve to leak on the outside of it, around the circumference of the valve.
Q. So you're looking for a good seal, in other words?
A. Yes.
Q. Is that how you would describe it, a good seal?
A. I think it's necessary to have a functioning valve.
Q. I'm just worried about words for now. "A good seal" is a good way to describe that concept?
A. Yes.
Q. Let's blow up in the same section the language under "Anchoring," and the last bullet point is what I'm interested in. It begins "Lower left ventricle." Let's make that as legible as we can make it. It's the section lower. It's the last piece of that puzzle right before "Tissue Valves." There we go, the bullet right before the "Tissue Valve" section, right there. It's difficult to read, so I'll read it aloud. Mr. Ratz, if I read it incorrectly, will you correct me if I get it wrong?
A. Sure.
Q. It reads, "Left ventricular anchors (LVA) initially

conceived as having a bulge design that could either tuck the native leaflets under the annulus or --" and this is what I want to focus on -- "or provide additional space to capture the native leaflets between the anchors and the frame."

So you're talking about two distinct anchoring concepts there, right?

A. The potential for either, yes.

Q. And you're talking about them as early as the Rev. A frame, correct?

A. Correct.

Q. And the Rev. A frame becomes the Rev. B frame, and the Rev. B frame is what you're willing to put on the Internet, correct?

A. That's true.

Q. Okay. So with respect to that Rev. A frame, you're acknowledging out loud in writing the idea of going behind the leaflets, correct? You can't put the leaflets between the anchors and the frame without going behind them, can you?

A. That's true.

Q. But this isn't the "aha" moment, is it?

A. No. The "aha" moment comes from actually evaluating it the other way, the way that we thought was going to work with the pinching, and recognizing in the animal study that that did not work; that what would have been the easier approach to just drop it in and expand it did not work, and so we had to go to

an alternative approach that we had not tested before that we tested at that point to try to enable it to anchor to the tissue, to the annulus.

Q. Well, let's leave what you know aside for a second and what you learned in your animal studies aside for a second. As early as your very first frame, between December of 2008 and January of 2009, the idea of going behind the leaflets, putting the leaflets between the anchors and the frame, that's nothing special, is it?

A. The idea is special once you realize that it works.

Q. Well, you think you're the first person to realize that that idea works?

A. I think we were.

Q. Well, the idea, you were able to articulate the idea in December of 2008, correct?

A. I was able to articulate it. That doesn't mean that it works.

Q. I didn't ask that. I want you to confirm with me, this is a concept you were able to reduce to writing in 2008, correct?

A. That is true.

Q. And you agree with me, this concept is clearly, unequivocally, it's going behind the leaflets. You can't put the leaflet between the anchor and the frame without going behind, correct?

A. That's true.

Q. And here, nothing in your document suggests this is some insightful, revolutionary concept, correct?
A. No. At that point we had not made any frames. We had not tested any frames. At the time of Rev. A, we never did any animal testing. We never did with B. It wasn't until C and putting it into practice that we recognized the value of that.
Q. I want you to focus on my questions, politely, Mr. Ratz.
A. Please.
Q. Well, I accept that. I know you're doing your best to do just that.
THE COURT: Mr. Flynn, when you come to a good place to stop --
Q. This concept, the idea of taking an anchor behind the leaflets to anchor behind them, which is where the annulus is, that idea you were able to come up with, you were able to write down without any suggestion that it was novel or inventive, without any frames being built, without any animal testing, without any clinical studies of any kind, correct? You had that idea in January of 2008, true?
A. Let's recall that I wrote this --
Q. Please just answer that question.
A. I don't know if I had that idea in January of 2008, but I wrote this document in February 22 of 2010, as we're looking back at my notebook. So I can't say that, you know, that was a concept in 2008.

Q. Well, let me suggest this and then we'll take our break: The concept you put in the section you're writing about in 2008, don't you?
A. That's true.
MR. FLYNN: Thank you. Why don't we stop now.
THE COURT: All right, thanks everyone. Tomorrow, 9:00 to 1:00. The students I thought were coming today are coming tomorrow, so we'll take our break a little bit early, but 9:00 to 1:00. Keep an open mind. Don't talk to anyone about the case. Stay away from the case, nothing on social media about it, and we'll see you all tomorrow.
THE CLERK: All rise for the jury.
(Jury excused.)
THE COURT: All right, I'll see you all tomorrow. You need to vacate this table because I have a 4:00 in here too.
MS. LEA: Your Honor, could we get an estimate for the amount of time remaining for Mr. Ratz's cross so that we can plan for tomorrow? We have a witness standing by.
THE COURT: My guess is, he doesn't know. He's not --
MR. FLYNN: That's true, your Honor.
THE COURT: Can you give them a ballpark?
MR. FLYNN: Not less than an hour, not more than two and a half.
MR. SGANGA: We may have an issue about taking a witness out of order then. When would be a good time to talk

about that?

THE COURT: Try to work it out. If you can't, I'll be around.

(Adjourned, 4:07 p.m.)

C E R T I F I C A T E

UNITED STATES DISTRICT COURT)
DISTRICT OF MASSACHUSETTS) ss.
CITY OF BOSTON)

We, Debra M. Joyce, Kelly Mortellite, and Lee A. Marzilli, Official Federal Court Reporters, do hereby certify that the foregoing transcript was recorded by us stenographically at the time and place aforesaid in Civil Action No. 14-12405-ADB, CardiAQ Technologies, Inc. v. Neovasc Inc., et al, and thereafter by us reduced to typewriting, and is a true and accurate record of the proceedings.

Dated this 5th day of May, 2016.

/s/ Debra M. Joyce, RMR, CRR

/s/ Kelly Mortellite, RMR, CRR

/s/ Lee A. Marzilli, RPR, CRR